Post Traumatic Stress Disorder in Injecting Drug Users: The Relationship with Dependence, Health, Risk-taking and Conflict.

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Declaration

I declare that this thesis has been composed by myself, and that the work contained here within is all my own. This thesis, nor any part of it, has been submitted for any degree or professional qualification other than that specified.

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ABSTRACT

Objectives

Posttraumatic Stress Disorder (PTSD) has been shown to be prevalent in individuals with Substance Use Disorders (SUD). The current study aimed to investigate the factors associated with comorbid PTSD-SUD and to identify any differences between groups of individuals with PTSD-SUD and those with SUD only.

Methodology

Thirty participants were recruited from community services for injecting drug users. All participants completed: The Maudsley Addiction Profile (MAP) to give measures of physical and psychological health problems, risk of blood borne virus (BBV) infection, and interpersonal conflict; The Leeds Dependence Questionnaire (LDQ) to measure severity of drug dependence; and the Posttraumatic Stress Diagnostic Scale (PDS) to determine the severity of trauma symptomatology. Comparisons were made between participants who met full diagnostic criteria for PTSD (N=19) and those who did not (N=11).

Results

Severity of drug dependence was positively correlated with trauma symptomatology and with the number of traumatic events experienced. The comorbid PTSD-SUD group had higher rates of psychological health problems and BBV risk than those with SUD only.

There was no difference in rates of interpersonal conflict and a trend towards an association with physical health problems.

Conclusions

Presence of PTSD is associated with higher rates of dependence, psychological distress, and risk of acquiring a blood borne virus amongst injecting drug users. Comorbid PTSD-SUD has been shown to negatively impact on treatment outcomes in individuals with substance use disorders. These findings therefore support the need for integrated treatment models for PTSD-SUD in order to effectively meet UK service delivery objectives.

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CHAPTER 1: INTRODUCTION

1.1 Definition of Substance Use Disorders (SUD)

The Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV: APA, 1994) defines substance use disorder (SUD) as a collective term for substance abuse and substance dependence. Substance abuse is characterised by repeated use of alcohol or other psychoactive substances despite this resulting in significant clinical impairment or distress, however use is not compulsive and there is no evidence of physiological dependency (i.e. tolerance or withdrawal on cessation). Substance dependence, on the other hand, typically involves three or more features over a twelve month period of: compulsion to use; unsuccessful attempts to control or reduce use; preoccupation with obtaining and using substances; persisting with use despite negative consequences; increased tolerance; physical withdrawal. Substance dependence supersedes diagnosis of substance abuse if an individual meets criteria for substance dependence.

In a study of individuals entering treatment for a substance use disorder in 2007/2008 in Scotland, 17% (1587 individuals) of those who reported using heroin were resident in the NHS Lothian area (ISD Scotland, 2008). Of those using heroin in Lothian, 22% reported injection as the only route of administration, 13% reported using a combination of intravenous and other methods (i.e. inhalation or intranasal use), and 65% reported never injecting. Injecting drug use (IDU) has been associated with multiple health risks such as inflammation of the veins, septicaemia, endocarditis, oedema, and transmission of blood borne viruses such as HIV, hepatitis B and hepatitis C (Day & Crome, 2002).

As around 35% of individuals entering treatment for heroin dependence report IDU, at least 555 individuals in Lothian alone will have been vulnerable to these conditions due to their injecting drug use. Furthermore, there are likely to be more injecting drug users in Lothian who are not in contact with treatment services.

1.2 Definition of Post Traumatic Stress Disorder (PTSD)

Post Traumatic Stress Disorder (PTSD) may occur following a traumatic event where the individual or another person suffers severe physical injury or their own or another's life is in danger (Criterion A). PTSD is characterised by re-experiencing of the event in the form of 'flashbacks' and nightmares (Criterion B), avoidance and emotional numbing (Criterion C), and hyperarousal (Criterion D), which may cause significant distress or impairment in social or occupational functioning (DSM-IV; APA, 1994). The diagnostic criteria also require that the individual's response to the traumatic event involves intense fear, helplessness, or horror and that that their symptoms persist for more than one month. PTSD is therefore experienced by those who are unable to integrate the experience of a traumatic event into their own histories (van der Kolk, 1996). The proportion of individuals who develop PTSD following a traumatic event has been reported to be 8.1% of men and 20.4% of women (Kessler *et al.*, 1995). The prevalence in the general population is approximately 2-5% (Stein *et al.*, 2000).

Individuals who have experienced a traumatic event who do not meet full DSM-IV criteria for PTSD may be suffering from 'subthreshold' PTSD. Subthreshold PTSD is

thought to be present when the individual reports significant impairment and distress and at least one re-experiencing symptom, and either three avoidance or two arousal symptoms (Blanchard *et al.*, 1994). In a primary care sample, Grubaugh *et al.* (2005) found the prevalence of subthreshold PTSD to be 4.6%. In addition to a subthreshold form of PTSD, there is also some evidence to suggest that individuals who suffer prolonged traumatic events or multiple traumas may develop an associated disorder known as 'complex PTSD' or 'disorders of extreme stress not otherwise specified' (DESNOS). Responses to traumatic events may therefore be seen as comprising a spectrum of conditions rather than a single disorder (Herman, 1992).

1.3 Prevalence of Comorbid PTSD and SUD

The prevalence of PTSD in treatment-seeking patients with substance use disorders has been found to be between 26-52% for lifetime PTSD and 15-41% for current PTSD (Schäfer & Najavits, 2007). Lifetime PTSD is diagnosed in individuals who experience an episode where they meet criteria for PTSD at some point in their life but may not exhibit current symptoms. Prevalence rates of lifetime PTSD tend to be higher than rates of current PTSD. Prevalence of lifetime PTSD has been found to be 7.8% of the US population and 1.9% of the population of Western Europe (Kessler *et al.*, 2008). Kimerling *et al.* (2006) validated a brief PTSD screen for use with a SUD population and found that in a sample with 33% prevalence, 75% had previously undiagnosed PTSD. They therefore argued that routine screening in SUD populations would increase detection of PTSD.

Driessen *et al.* (2008) investigated the prevalence of PTSD in a sample of treatment-seeking patients ($N = 459$) with substance dependence (alcohol, drugs, or both). They used two standardized measures of PTSD: the International Diagnostic Checklist for the ICD-10 (IDCL; Hiller *et al.*, 1995) and the Posttraumatic Stress Diagnostic Scale (PDS). As the IDCL has been found to have a lower diagnostic threshold than the PDS as it is based on the ICD-10 criteria and not DSM-IV, participants were only diagnosed as having PTSD if they met criteria for PTSD on both measures and were deemed 'subsyndromal' if they achieved a diagnosis on only one measure. It was found that there was 78% agreement between the IDCL and the PDS, which resulted in a diagnosis of PTSD in 25% of the sample, and the remaining 22% were classified as having subsyndromal PTSD.

Two other groups were also included in this study: a trauma exposure group and a non-exposure group. Drug dependent participants were found to have a current PTSD prevalence of about 30% and those with comorbid drug and alcohol dependency had a PTSD prevalence of about 34%, which was significantly higher than those with alcohol problems alone who had a prevalence of 16%. The total prevalence of PTSD across all groups was found to be 36-57% if subsyndromal PTSD was included. Trauma exposure was present when individuals reported an event which met the DSM-IV criterion A for PTSD and was found to be comparable across all groups at around 18% suggesting that the higher rates of PTSD symptomatology were not a result of increased levels of

exposure to traumatic events. Furthermore, the overall trauma exposure rate was found to be comparable with that of the general US population.

A large scale study (N = 615) which was conducted in Australia looked at prevalence and correlates of PTSD in a sample of individuals with heroin dependence (Mills *et al.*, 2005) found that 92% of participants had experienced trauma exposure and 41% met criteria for lifetime PTSD. Of those individuals who had been exposed to a traumatic event, 45% met DSM-IV criteria for current PTSD. Those participants with current PTSD exhibited a chronic course with an average duration of 9.5 years. Significant gender differences were observed with women more likely to have been raped or sexually abused and men more likely to have experienced a life-threatening accident or witnessed serious injury or death.

Reynolds *et al.* (2005) conducted a prevalence study with a UK sample of patients with substance use disorders (N = 52). They found that 38.5% of inpatients met criteria for current PTSD and 51.9% met criteria for lifetime PTSD, which is consistent with the studies outlined above. In another UK study, Christo and Morris (2004) reported that 93.3% of current substance users, 80% of recently abstinent substance users, and 76.7% of non-substance users in their sample (N = 205) reported having experienced a traumatic event (as defined by DSM-III-R; APA, 1987) at some point in their life. This indicated a significantly higher tendency for active substance-misusers to report at least one traumatic event compared to non-substance-misusers which is in keeping with Mills *et al.*'s (2005) findings. The similar rates of trauma exposure between recently abstinent

and non-substance users, in comparison to the higher rates reported in current substance users, may indicate that trauma exposure may be a barrier to achieving abstinence.

Despite the largely consistent findings of prevalence in this population, it has been argued that studies of PTSD in SUD populations are limited as "the variation in substance use classification across studies hinders the direct comparison of comorbid rates" (Johnson, 2008: 242). Johnson (2008) emphasises the need for studies to clarify the types of substances used, the severity of substance use (e.g. substance abuse versus dependence), and whether PTSD or trauma exposure is being measured. She also notes that the nature of the trauma may influence outcome and that violent trauma may led to more severe PTSD and SUD symptoms. The remainder of this review attempts to address some of these issues.

1.4 Theories of Posttraumatic Stress Disorder

Early models of PTSD drew on a range of existing theoretical frameworks such as psychodynamic theory (social-cognitive theories), learning theory (conditioning theories) and information-processing theories (Brewin & Holmes, 2003). Each of these three broad categories of theoretical model was limited by the dearth of empirical evidence about PTSD that was available at the time. Nevertheless, they have provided useful foundations for the subsequent models which are outlined below.

1.4.1 Emotional Processing Theory

Emotional processing theory proposes that individuals with rigid beliefs about themselves, others and the world would be more vulnerable to developing PTSD than those who do not have such beliefs (Foa & Rothbaum, 1998). The model builds upon Foa *et al.*'s (1989) fear network approach which suggests that perceived threats trigger a pathological memory network of fear-related physiological, behavioural and cognitive responses known as a 'fear structure'. Emotional processing theory states that individuals who develop PTSD are more susceptible to engaging in negative appraisals which in turn reinforce existing maladaptive schemas and fear structures. The theory posits that there are two key negative beliefs involved in the formation and perpetuation of posttraumatic symptomatology; the victim believes that the world is an extremely dangerous place and that they are incapable of coping with stressful events (Foa & Cahill, 2001; Jaycox *et al.*, 2002).

The components of this model then provide a framework for therapeutic intervention which consists of techniques such as psychoeducation about traumatic stress responses, breathing retraining, imaginal and in vivo exposure, and cognitive restructuring. The aim of this treatment is to assist individuals in processing the traumatic event by modifying fear structures through activating them and providing disconfirming evidence for the two negative schemas. This process breaks the fear associations which maintain PTSD symptomatology and in turn promotes integration of the traumatic event and thus recovery (Rauch & Foa, 2006). Studies which have evaluated this cognitive-behavioural treatment approach have demonstrated its efficaciousness and it is recommended as the treatment of choice for PTSD in both the United Kingdom and the United States of

America (ISTSS, 2009; NICE, 2005). However, it has also been suggested that the mechanisms which yield these improvements may not be fully explained by the information processing model and there have been criticisms that it does not account for phenomena such as dissociation and incomplete trauma narratives (Brewin & Holmes, 2003).

1.4.2 Dual Representation Theory

The dual representation model of PTSD outlines two features which explain PTSD symptomatology. These are, firstly, the existence of two types of memory about the traumatic event and secondly, the possibility that some individuals will engage in premature inhibition of emotional processing (Brewin *et al.*, 1996). The two types of trauma memory are referred to as 'verbally accessible memories' (VAMs) and 'situationally accessible memories' (SAMs). VAMs are forms of autobiographical memory which contain some information about the traumatic event and can be consciously retrieved and shared with other people. They may also contain gaps or incomplete representations due to limited attentional capacity associated with high levels of anxiety, and it is thought that this may be particularly relevant in cases where a traumatic event is prolonged or repeated. In contrast, SAMs are only accessed automatically when salient internal or external cues are encountered. The other distinctive feature of the dual representation model is the inclusion of three potential outcomes of emotional processing: complete processing or integration, chronic emotional processing, and premature inhibition of processing.

Chronic emotional processing refers to a state where individuals repeatedly process both the VAMs and SAMs concerning the traumatic event but with little or no change to the representations. This then results in a chronic state of hyperarousal and the ongoing presence of memory and attentional biases towards trauma-related material. A potential side effect of chronic emotional processing is secondary psychopathology such as anxiety or depression and the development of maladaptive coping responses such as substance abuse. The other incomplete form of emotional processing is premature inhibition which occurs when there has been repeated avoidance of SAMs and VAMs. If this process becomes automatic, it can result in a lack of intrusive memories and an ability to relate aspects of the trauma without experiencing negative emotions. It is also associated with dissociation and somatisation, and clinically can explain why some individuals with PTSD may benefit from exposure techniques to facilitate emotional processing years after the traumatic event. In addition to behavioural interventions such as exposure, Brewin *et al.* state that their model also sets a rationale for the necessity of using cognitive therapy techniques prior to the use of exposure, to tackle negative appraisals and secondary negative emotions such as anger or guilt.

1.4.3 Cognitive Model of PTSD

In their cognitive model of PTSD Ehler and Clark (2000) proposed that the disorder arises when individuals who have experienced a trauma process it in such a way that they develop a sense that the risk of serious danger is ongoing. This occurs when individuals engage in negative appraisals of the trauma or their PTSD symptoms. Such negative appraisals include external and internal threats such as those outlined in Foa

and Rothbaum's (1998) emotional processing model. The other process which is proposed as potentially leading to the development of PTSD is the way in which the trauma is encoded in memory and its link to other autobiographical memories. The model proposes that individuals who develop PTSD fail to properly integrate the trauma memory in their autobiographical memory and respond strongly to conditioned cues associated with their trauma which leads to unintentional and intrusive recollections and experiences. Re-experiencing is also associated with implicit memory traces due to a reduced perceptual threshold for stimuli that were temporally associated with the trauma. This aspect of the model aims to address the encoding of trauma memories and does so in a rather different way to the dual representation model (Brewin *et al.*, 1996) as it only proposes one trauma memory, not two. The sequelae explained by Brewin *et al.*, as arising from SAMs and VAMs is better accounted for with the cognitive model which cites poor elaboration of autobiographical memory and classical conditioning.

The cognitive model of PTSD also seeks to explain key features of the disorder such as delayed onset. This is thought to occur when a later event leads to a reappraisal of the initial event, rendering it more threatening in the mind of the victim, or when stimuli associated with the trauma are only encountered some time after the event. Like the other two theories, the model also proposes an explanation for the lack of benefit arising from talking or thinking about the trauma due to the failure to experience related affect and thus preventing the opportunity to contextualise the event in memory. The cognitive model fits with the cognitive behavioural treatment approach, particularly as there is a

strong emphasis on negative appraisals in the development and maintenance of PTSD which would be most effectively addressed with cognitive restructuring.

1.5 Theories of the Relationship between PTSD and SUD

Three main hypotheses have been proposed to explain the relationship between PTSD and SUD.

1.5.1 Self-Medication Hypothesis

The self-medication hypothesis suggests that substance use disorders may develop as a method of coping with the adverse reactions associated with experiencing a traumatic event. Reed *et al.* (2007) conducted a longitudinal study (N = 988; aged 19-24 years) which found that the risk of developing substance abuse or dependence was six times higher in individuals who had PTSD compared to those who had not been exposed to trauma (lifetime exposure to at least one traumatic event as defined by DSM-IV criterion A), with the PTSD group twice as likely to develop a SUD compared to those who were exposed to a traumatic event but did not develop PTSD. Based on their findings, the authors suggested that PTSD may be a risk factor for individuals with emerging drug problems and may lead them to progress to having a diagnosable substance use disorder as a result of their attempts to self-medicate.

The functional associations between trauma, PTSD and substance-related disorders have also been investigated (Stewart *et al.*, 1998). In keeping with the findings of Reed *et al.*,

their literature review determined that in most cases traumatic events occurred prior to the onset of substance misuse. They argue that the majority of studies which were reviewed support the self-medication hypothesis of the relationship between PTSD and SUD. They also acknowledge that prospective and longitudinal studies may present evidence of other functional associations between PTSD and SUDs that are unlikely to be unidirectional, rather there is a vicious cycle where PTSD leads to self-medication and symptoms may in turn be exacerbated by substance use. Furthermore, the PTSD self-medication model may apply to a more general negative affect including anger, anxiety and depression (Ouimette *et al.*, 2007). This suggests that individuals may use substances to reduce the impact of any negative affect and therefore this process is not unique to individuals with PTSD.

Fisher (2000) proposed that this misuse of substances to cope with PTSD symptoms functions as a survival mechanism in the short-term as it allows individuals to distance themselves from intrusive memories or reduce their level of arousal. This then leads to addiction in the longer-term when the dose required to maintain the self-medicating effect and prevent physical and emotional withdrawal increases: "the substance use gradually acquires a life of its own that, over time, becomes increasingly disruptive to the patient's functioning until it is a **greater** threat to that individual's life than the symptoms it attempts to keep at bay" (emphasis in original, p. 1). Substance use can therefore be conceptualised as an attempted way of controlling symptoms without depending on others.

1.5.2 High Risk Hypothesis

This hypothesis proposes that substance use disorders are part of a wider group of high-risk behaviours which increase the risk of exposure to potentially traumatic events and therefore increases the risk of developing PTSD. Johnson *et al.* (2006) investigated the temporal association between exposure to traumatic events and substance use onset. Their hypothesis was that substance use would precede the onset of PTSD in polysubstance users. They recruited a sample of injecting drug users who used crack cocaine and/or heroin ($N = 1098$). The hypothesis was supported by the findings which showed that onset of polysubstance use began prior to experiencing the traumatic event. On average, male heroin users began using heroin eight years prior to exposure to a traumatic event whilst female heroin users began using heroin before experiencing a traumatic event but within one year of exposure. Women were more likely to experience the qualifying event earlier than men and early alcohol use was found to be a risk factor for women. Crack cocaine was the only substance where use was initiated subsequent to trauma exposure, and this may be related to re-experiencing symptoms as stimulants have been shown to decrease shame and guilt associated with trauma and reduce re-experiencing symptoms by producing a chemical barrier or "high" (Fisher, 2000; Saladin *et al.*, 1995).

These findings also appear to support the work of Cottler *et al.* (2001) who investigated the role of gender in the relationship between substance use disorders and PTSD. They found the prevalence of trauma exposure to be 36% and that those who met criteria for SUD were more likely to report lifetime trauma exposure. As reported in other studies,

women were significantly more likely to report rape than men and men were significantly more likely to report being physically assaulted than women. Of those reporting exposure to a traumatic event, 18% met criteria for PTSD. Women were more likely to meet criteria for PTSD than men. Interestingly, while polydrug use, injecting drug use and presence of an SUD disorder were predictive of exposure to trauma, they were not associated with a progression to PTSD. Individuals with pre-existing schizophrenia, generalised anxiety disorder, or a phobic disorder were more likely to develop PTSD following exposure to a traumatic event. Onset of illicit drug use was found to occur on average seven years prior to the traumatic event. When divided by gender, this was an average of four years pre-trauma for women and eight years pre-trauma for men. Together these findings support the high risk hypothesis and Cottler *et al.*'s (2001) findings for male participants are in keeping with those of Johnson *et al.* (2006).

1.5.3 Vulnerability Hypothesis

The vulnerability hypothesis, also referred to as the 'susceptibility hypothesis', proposes that individuals who engage in substance misuse are more susceptible to developing PTSD following exposure to a traumatic event. Various explanations have been given for this association including pre-existing affect dysregulation, cognitive impairment due to chronic substance abuse, or limited coping mechanisms.

Higher childhood sexual abuse (CSA) severity is associated with increased risk of comorbid PTSD and SUD (Ullman, Townsend *et al.*, 2006). Kingston and Raghavan

(2009) investigated associations between sexual abuse, early initiation of substance use, and adolescent trauma. Their findings did not support their hypotheses that CSA would predict a younger age of first use of substances or exposure to additional traumatic events. However, a younger age of first substance use was significantly associated with subsequent exposure to additional traumatic events and risky behaviour. Risky behaviour and additional traumatic events in turn were significantly associated with current PTSD. These findings led the authors to conclude that "early substance use initiation may increase the risk of exposure to traumatic events due to poor judgement caused by intoxication and other correlates of early substance use such as a propensity for risk taking and association with delinquent peers" (p. 67). Their model would therefore suggest that CSA may have an indirect influence on later SUD and PTSD, by way of a vulnerability created by adverse childhood events.

A large-scale study in the United States investigated the link between multiple forms of childhood maltreatment and adult mental health in a community sample (The Adverse Childhood Experiences (ACEs) Study: Edwards *et al.*, 2003). The authors found a dose-response relationship between the number of types of maltreatment and mental health scores. It was also found that more than one third of the sample had experienced more than one form of maltreatment. In keeping with the findings of adult traumas, women were significantly more likely to report higher rates of childhood sexual abuse (25.1%) and men reported significantly higher rates of physical abuse (21.7%). Women reported significantly more levels of emotional abuse than men and this was associated with higher levels of mental health disorders. Significant main effects were found for the

number of reported types of abuse, intensity of emotional abuse, and the interaction between these two factors. This led the authors to conclude that "multicategory abuse is the norm rather than the exception" (p. 1459).

Another paper based on this study investigated the associations between childhood maltreatment, household dysfunction and morbidity and mortality in later life (Felitti *et al.*, 1998). It reported that multiple categories of childhood exposure to maltreatment were associated with multiple health risk factors including smoking, severe obesity, physical inactivity, depressed mood, suicide attempts, alcoholism, drug abuse, parental drug abuse, high lifetime number of sexual partners, and history of sexually transmitted infections. Seven categories of maltreatment were investigated: psychological abuse, physical abuse, sexual abuse, living with adults with substance abuse, mental illness, maternal battery, or a member of the household being imprisoned. The study reported that 25.6% of the sample had childhood exposure to substance abuse in their household. A comparison of those with no experience of childhood maltreatment (47.9% of the total community sample) with those who had experienced four or more forms of maltreatment (6.2%) showed a ten fold increase in the likelihood of injecting drug use. Multiple experiences of maltreatment were found to increase the likelihood of individuals engaging in health risk behaviours such as smoking, alcohol or drug use, overeating or sexual behaviours as coping strategies and these could become chronic. These coping strategies may arise as a result of chronic emotional processing and the high levels of arousal arising from this, or may lead to premature inhibition of emotional processing, as outlined by the dual representation theory.

The cumulative impact of childhood sexual abuse, adult sexual assault, and intimate partner violence has also been examined (Follette *et al.*, 1996). They reported that scores on the Trauma Symptoms Checklist indicated that participants who had experienced greater numbers of traumatic events had significantly higher levels of trauma symptomatology. This finding highlighted that recent traumas may exacerbate symptoms from previous traumatic experiences and multiple trauma exposure may also impact on the recovery rate from subsequent trauma, supporting the hypothesis that repeated exposure to trauma has a cumulative effect. From these results, Follette *et al.* hypothesised that revictimisation may be more likely to occur in individuals with substance use disorders as the use of chemically or psychologically induced dissociation may lead to risk of further traumatic events. Additionally, it is possible that adverse early experiences may result in specific skills deficits which increase the risk of revictimisation. These findings may also fit with emotional processing theory as multiple early adverse experiences may lead to the development of fear structures in childhood and maladaptive schemas which are activated and reinforced by later traumatic events.

The incremental effect of exposure to violence on mental health status has been investigated by Hedtke *et al.* (2008). Their study of womens' exposure to violent events reported that five of the seven lifetime exposure categories (including physical abuse, sexual abuse, and a combination of these factors plus witnessing violence) were significant predictors of exhibiting PTSD within the past year. All categories, with the

exception of witnessing violence only, were predictive of a major depressive episode and this risk was higher when multiple categories of violence were experienced. Similarly, all violence categories, with the exception of witnessing violence only, were predictive of substance use problems with multiple categories and experiencing a new violent event in the past year being significant risk factors. The only factor which predicted further victimisation over a one year period was having a history of PTSD – major depressive disorder and substance use problems were not found to increase the risk of subsequent traumas.

Messman-Moore & Long (2003) conducted a comprehensive review of studies pertaining to the sequelae of childhood sexual abuse in women and their association with sexual revictimisation. These sequelae included posttraumatic stress disorder, dissociation, substance abuse, sexual behaviour, risk recognition difficulties, and interpersonal difficulties. It was hypothesised that substance abuse functions as a form of 'chemically induced dissociation' and therefore allows individuals to engage in avoidance of aversive internal and external experiences. However, it has also been shown that intoxication increases the likelihood of rape or sexual assault and substance abuse may be a predisposing factor for revictimisation. Difficulties with risk recognition were not supported as factors relating to revictimisation in the literature reviewed. Some evidence was found to support the role of sexual behaviour and interpersonal functioning as factors contributing to revictimisation, although results were mixed and require further investigation. The relationship between PTSD and revictimisation was also unclear, due to the retrospective nature of studies, as it may function as either an

underlying causal mechanism by triggering dissociation, or as an outcome of revictimisation. In addition to this, studies were also presented which appeared to lend support to the 'sensitization hypothesis' that individuals with early traumatic experiences would experience a sensitization of the hypothalamic-pituitary-adrenal (HPA) axis and that hyperarousal and numbing may desensitize or delay appropriate responses to risk or danger. This process is seen as bidirectional and interactive, and therefore causality is extremely difficult, if not impossible, to determine. For individuals with problem substance use, this process is also likely to be influenced by the impact of substances on cognitions, emotion regulation, and coping mechanisms.

Hien *et al.* (2005) undertook a review of the literature to determine associations between traumatic stress, substance use disorders, and self-regulation. Their examination of prospective studies supported the hypothesis that early trauma exposure occurs prior to substance use in some cases and dysregulation of emotion may be a key feature in the development and chronicity of substance abuse and dependence. They go on to explore the links between early traumatic experiences and development of self-regulatory mechanisms which indicate that individuals with early adverse experiences exhibit fewer adaptive coping strategies, have difficulties containing strong emotions, and are more likely to doubt the ability of others to provide them with support in difficult situations. These difficulties are thought to be attenuated if such individuals encounter subsequent revictimisation in adulthood, leading to problems associated with poor affect regulation and interpersonal functioning. Furthermore, the reviewers highlight the structural changes of the limbic system resulting from traumatic experiences which lead to

disruption of self-regulatory functions. This is thought, in turn, to lead to increased vulnerability to substance use as individuals attempt to overcome deficits in self-regulation (Brady, 2001).

Pirard *et al.* (2005) investigated the link between a history of physical and/or sexual abuse in childhood and addiction treatment in a study of 700 substance abusers who were seeking day or residential treatment. It was found that 47.3% of the sample reported a history of abuse in childhood and the remainder did not. Those individuals with a history of childhood abuse were found to have significantly higher rates of psychiatric comorbidity and more psychiatric hospitalisations in a one-year period than those without such a history. No differences were found on severity of drug use, the number of previous treatments for substance abuse, or rates of engagement in treatment. However, this study looked purely at the effects of physical or sexual abuse in childhood and did not address issues associated with other traumas in childhood or adulthood. There is also a question as to whether the similar rates of addiction severity between the trauma-exposed and non-trauma-exposed group are due to the fact that individuals with more complex trauma histories may have higher rates of addiction severity and an associated chaotic lifestyle which prevents them from entering intensive substance abuse treatments such as this one.

Christo and Morris (2004) investigated the prevalence of traumatic event prevalence and anxiety in a UK sample of current substance users, recently abstinent substance users and non-substance users. All participants completed the State Trait Anxiety Inventory

(STAI) and the National Comorbidity Study List of Lifetime Traumatic Events (NCS-LTE) which is based on DSM-III-R criteria for a traumatic event. The participants were also invited to indicate how often they thought about the traumatic event(s). It was found that current substance users were significantly more likely to have experienced a traumatic event than non-substance users. The average number of traumas endorsed and the rate of childhood sexual abuse were significantly higher in the substance use group than the non-substance use group. The number of male survivors of CSA was eight times higher in the substance use group. Almost one third of traumatic events were rated as having a high impact as determine by a rating of having 'thought about it often or almost always'. However, given that individuals with substance use disorders have a tendency to report intrusion symptoms less often then avoidance/numbing or hyperarousal symptoms, this may not be the best method of determining severity of impact.

Rates of anxiety were found to be similar in current and recently abstinent substance users and both of these groups showed significantly higher rates of anxiety compared to non-substance users. Further analyses confirmed that the groups did not differ in terms of age, gender or socioeconomic status. A significant positive correlation was found between the overall number of 'high impact' events (but not overall number of traumatic events) and level of anxiety. One limitation of this study is that it does not measure all features of PTSD. The authors also suggest that early traumatic experiences do not impact on current anxiety levels and that temporal proximity to trauma should be considered in treatment. However, they do not address the role of dissociation,

avoidance, and the link between early traumatic experiences and later victimisation. They acknowledge that withdrawal effects from substances such as benzodiazepines and opiates mimics biological symptoms of PTSD and may increase vulnerability to relapse (Young, 1990). There is also a discussion of potential causal pathways between PTSD and SUD, which they conclude is unlikely to be "mutually exclusive".

1.6 Impact of PTSD and SUD

1.6.1 Impact of PTSD-SUD on Presentation

Individuals with both PTSD & SUD (PTSD-SUD) are more likely to have vivid recollections and use certain substances (i.e. depressants) in order to 'forget' or mitigate these intrusions compared to individuals with PTSD only (Stewart *et al.*, 1998). Similarly, substances which dampen arousal may be used to reduce PTSD-related hyperarousal. Saladin *et al.* (1995) conducted two studies looking at traumatic event exposure and severity of PTSD symptoms. They found that individuals with comorbid PTSD-SUD had a greater number of PTSD symptoms in the Criterion C (avoidance/numbing) cluster and Criteria D (arousal) cluster than the PTSD only group. These group differences were most evident for the arousal symptom of sleep disturbance. The authors point out that one potential reason for the greater endorsement of these clusters is that they have greater overlap with withdrawal and other features of chronic substance use such as loss of interest and feeling detached from others. Conversely, there is no difference in trauma-specific symptoms as illustrated by the

Criterion B (intrusion) cluster. This suggests that differences in presentation between individuals with PTSD who have comorbid SUD and those who have PTSD alone may be due in part to symptoms which result from chronic substance use.

However, another study found that SUD was associated with worse intrusive and avoidance symptoms of PTSD and with dissociation (Ford *et al.*, 2007). This led the authors to propose that survivors of early victimization traumas are subject to disruptions of psychobiological regulation which gives rise to complex PTSD. Complex PTSD is a post-traumatic syndrome which occurs in some individuals who have been exposed to prolonged, repeated trauma (Herman, 1992). PTSD and complex PTSD may co-occur but have different risk factors and clinical correlates (Ford, 1999). The impact of complex PTSD on treatment for substance use disorders may include difficulties with engagement, skill-learning, and achieving abstinence from illicit substances. Complex PTSD was found in the Ford (1999) study to be correlated with PTSD symptoms, psychological distress, and past physical abuse, witnessed assault and serious life threats. An inverse correlation was found between complex PTSD following witnessing an assault and treatment retention and in-treatment abstinence. Where participants with complex PTSD were divided by a median split, those in the 'low' complex PTSD were found to be older and have longer histories of heroin use than those with 'high' complex PTSD, however the severity of drug use was not investigated. No differences were found in the multivariate predictors when continuous scores were used in place of dichotomous scores, suggesting that the median split was an acceptable way to compare these two groups.

Rash *et al.* (2008) investigated the correlates of PTSD/SUD in a sample where all participants had experienced a crime-related traumatic event. They found that the use of opiates was very low (2.4%) compared to the use of alcohol and cocaine (72.6% and 50.8% respectively). Participants who did not meet the criteria for PTSD were found to exhibit some post-traumatic symptoms although there is an overlap with these symptoms and withdrawal symptoms, generalised distress, and other psychiatric conditions. These symptoms may therefore make it difficult to accurately diagnose PTSD in SUD populations. The authors suggested that Criterion C (avoidance) symptoms are the most important in discriminating PTSD participants from the rest of the sample.

1.6.2 Impact of PTSD-SUD on Functioning

In the Mills *et al.* (2005) study, PTSD was associated with first intoxication at a younger age, more polydrug use, longer using careers, higher rates of previous treatment attempts, and poorer physical and mental health. The study reported that there were no differences in age of first heroin use or frequency of use prior to starting treatment between those with and without PTSD. It was found that participants with and without PTSD were equally likely to have been involved in criminal activity, but those with PTSD were significantly more likely to be involved in violent crime. No differences were observed between groups for risky injecting behaviours. Factors associated with current PTSD were older age, female gender, borderline personality disorder, nominating sexual abuse as the most distressing event, and having experienced a greater number of traumatic events.

Reynolds *et al.* (2005) hypothesised that the PTSD-SUD population would be more impaired than those who had SUD-only and that inpatients would have more severe difficulties than outpatients. The findings indicated that those with PTSD-SUD had experienced more sexual assaults, more multiple traumas, and higher levels of distress than those with SUD-only. The PTSD-SUD group also had significantly higher Addiction Severity Index (ASI) medical scores, higher psychiatric ratings on the Brief Symptom Inventory (BSI), and higher scores on the psychoticism subscale. Individuals with PTSD-SUD were found to have higher rates of polydrug use prior to entering treatment and rated traumatic memories as being significantly more distressing both before and after ceasing drug use. The PTSD-SUD group were also more likely to report an increase in frequency of traumatic memories following cessation compared to the non-PTSD SUD group. This finding suggests that substances were used by individuals in the PTSD-SUD group to inhibit emotional processing and again gives some support for the dual representation model.

1.6.2.1 Severity of dependence on substances and PTSD

In addition to measuring prevalence of PTSD, Driessen *et al.* (2008) measured severity of substance use using the Addictions Severity Index (ASI; McLellan *et al.*, 1992) and three groups were identified: an alcohol only group; a drugs only group; and a comorbid drugs and alcohol group. The hypothesis that meeting full criteria for PTSD would be associated with more severe substance dependence than subsyndromal PTSD or trauma exposure only was partly supported by the finding that those with PTSD had

significantly higher levels of craving for substances than participants in the subsyndromal, trauma exposure, and non-exposure groups. It was also reported that subsyndromal PTSD was associated with increased psychopathology, as measured by the Brief Psychiatric Rating Scale (BPRS), and this was significantly higher than in the exposure and non-exposure groups. However, the prediction that the subsyndromal group would have higher levels of addiction severity and dependence compared to the exposure group was not supported.

Additionally, it was found that the 'exposure' group was comparable with the 'non-exposure' group in terms of addiction severity, suggesting that other psychopathology such as anxiety/depression or coping style may differentiate between those who do and those who do not develop PTSD. Similarly, Bonin *et al.* (2000) compared a PTSD, subsyndromal PTSD, and non-PTSD group of individuals enrolled in substance use disorder treatment. They found that participants with PTSD and subsyndromal PTSD reported significantly higher rates of substance use to cope with difficulties than those who did not meet criteria for PTSD. The findings of these studies also highlighted that at least two aspects of dependency were associated with comorbid PTSD and SUD. These features were compulsion to use (craving or perceived inability to abstain when triggered by salient cues) and cognitive set (the belief that substance use has become central to the individual's existence). These negative appraisals are similar to those outlined in both Foa and Rothbaum's (1998) and Ehler and Clarke's (2000) models as they present the self as incompetent (unable to refuse substances) and the world as dangerous (substances cannot be avoided).

Clark *et al.* (2001) compared a sample of one hundred and fifty individuals enrolled in treatment for opiate dependence. The study aimed to determine the effect of exposure to traumatic events and PTSD symptomatology on severity of drug use and the findings suggested that recency of PTSD symptoms was a significant factor in predicting drug use severity scores. PTSD was also significantly associated with higher rates of additional psychopathology and having a history of suicide attempts when compared with those who did not have PTSD. The authors point to the need for early integrated treatment for PTSD-SUD in order to reduce the likelihood of relapse as recent PTSD symptoms were shown to increase severity of drug use. This relationship therefore suggests that both disorders require to be treated in order to maximise chances of recovery.

1.6.2.2 Cumulative trauma and dependence

Bonin *et al.* (2000) conducted a study which looked at the prevalence of PTSD and subsyndromal PTSD in a sample of substance users attending community-based treatment. Their results indicated that individuals who met criteria for PTSD had experienced significantly more potentially traumatic events than those without PTSD. Individuals with PTSD exhibited significantly higher severity of substance dependence than those with subsyndromal or no PTSD suggesting that those with cumulative trauma had higher rates of dependence. While this is an interesting finding, the study is limited by the small sample ($N = 91$) which may have made it difficult to detect differences between the three groups (PTSD, 'possible' PTSD, and no PTSD). Ullman, Townsend

et al. (2006) investigated comorbid PTSD and polysubstance use in a sample of women who had experienced sexual assault. They divided the sample into four groups depending on whether the participants had PTSD only (47%), PTSD and illicit drug use (8%), PTSD and alcohol abuse (21%), or PTSD and polysubstance use (24%). Participants with polysubstance use and PTSD were found to have significantly more extensive trauma histories and greater use of substances as a coping mechanism when compared to all other groups. As those individuals who had experienced a greater number of traumatic events were found to have greater reliance on substances, it seems that the cumulative effect of trauma may predispose them to more severe and/or polysubstance dependence.

1.6.2.3 PTSD-SUD and Physical health

Ouimette *et al.* (2006) aimed to address the relationship between the health and functional status of SUD participants with and without PTSD. They hypothesised that participants with PTSD-SUD would report more chronic physical symptoms and poorer functional status and well being than patients with SUD alone. The sample comprised 133 inpatients in a private hospital setting. Homelessness was an exclusion criterion, and almost half of the sample had college-level education and worked full-time. The results indicated that participants with comorbid PTSD-SUD reported more cardiovascular and neurological symptoms than those with SUD alone and had a greater number of chronic physical symptoms. The participants with PTSD-SUD also reported significantly worse physical functional status on measures of bodily pain and general health. With regard to mental health, PTSD-SUD participants also reported worse

functional status and wellbeing than those with SUD alone. This remained significant after controlling for gender, ethnicity, and chronic physical symptoms. SUD was found to be associated with poorer functional health and wellbeing however PTSD increased this risk. Given the socioeconomic status of this particular sample, it is difficult to determine to what extent these findings can be generalised. The authors also note that their data are cross-sectional and therefore causality cannot be inferred.

Tate *et al.* (2007) also investigated the association between trauma exposure and physical health in substance-dependent veterans. Their hypothesis was that individuals with comorbid PTSD and SUD would have the most health problems, followed by those with trauma exposure and SUD, and then the SUD-only group. They found that the SUD-only group had significantly lower rates of physical health problems than the other two groups. The PTSD-SUD had the highest rates of physical health problems, but these were not significantly higher than the SUD-trauma group. The PTSD-SUD exhibited the highest rates of chronic health problems, followed by the SUD-trauma group, and the SUD-only group reported significantly fewer chronic health problems than the other two-groups. The groups did not differ with regard to the type of chronic health problems reported and there were no differences between groups with regard to rates of acute health events. The SUD-only group was found to have less health service utilization days and rated their health as significantly better than the PTSD-SUD group. A potential explanation for the higher rates of physical health problems in the PTSD-SUD group was their increased exposure to repeated cycles of adaptation to stress. This

may had led to an increase in allostatic load which in turn leads to increased susceptibility to illness.

1.6.2.4 PTSD-SUD and Psychological health

Bonin *et al.* (2000) also found that individuals with PTSD and SUD reported significantly higher levels of psychological distress on standardised measures (depression, anxiety, and sensitivity to anxiety) compared to those without comorbid PTSD. Similarly, Wasserman *et al.* (1997) found that participants in their study of cocaine-dependent individuals enrolled in private SUD treatment were significantly more likely to have a current major depressive episode, manic episode, panic disorder, simple phobia, or dependence on sedatives if they were diagnosed with PTSD than those who had SUD alone. The authors suggest that this increase in psychopathology may be due to an overlap in symptom criteria between PTSD and other psychiatric diagnoses. However, they also note that PTSD is only one potential outcome following the experience of a traumatic event and some individuals may go on to develop multiple disorders.

The impact of comorbid PTSD- SUD on psychiatric treatment rates has been investigated by Brown *et al.* (1999). They found that 50% of their inpatient sample met criteria for current PTSD and 95% had been exposed to a Criterion A event in their lifetime. Similar to other studies, female participants were significantly more likely to have experienced rape and adult physical abuse than male participants. Women also experienced significantly more types of trauma. No differences were found between

PTSD and non-PTSD participants on substance use behaviours such as frequency or severity of use or on the overall rates of using inpatient or outpatient addiction or psychiatric services. Whilst no differences were found between groups on use of addiction or psychiatric services, individuals with comorbid PTSD-SUD had a significantly greater number of overnight stays for SUD-related treatment which was much more costly than other forms of treatment. The finding that PTSD participants made significantly greater use of overnight inpatient stays was therefore thought to be due not to more severe or chronic SUD but possibly due to coping or personality style. This seems possible as the PTSD group had significantly higher rates of comorbid Axis I disorders compared to the non-PTSD group and greater rates of psychiatric distress. They also had higher rates of Cluster B personality disorder symptoms, i.e. antisocial, histrionic, borderline, and narcissistic personality disorders, which have been termed "flamboyant and dramatic" (Davidson, 2007). This apparent vulnerability to the development of a personality disorder fits with the cognitive model of PTSD – which proposes that PTSD arises from difficulties in integrating traumatic events into autobiographical memory – as this may give rise to problems in forming a coherent sense of identity. The impact of intrusions on affect and behaviour may also explain some of the characteristics of Cluster B personality disorders. Further analysis of the data also indicated that PTSD was a significant factor in determining admissions to psychiatric inpatient facilities when other comorbidities were controlled for. These findings suggest that PTSD-SUD patients are not receiving the psychiatric input that they require.

Strengths of this study were that it had an adequate number of participants for a prevalence study (N = 95); the measure used to diagnose PTSD, the Clinician Administered PTSD Scale (CAPS; Blake *et al.*, 1990), has been considered to be the "gold standard"; and the inclusion of a corroborative source of reported traumatic events. Potential limitations were the recruitment of patients from a private psychiatric hospital and the exclusion of individuals who were homeless or illiterate. As these criteria would have excluded most of the substance-misusing population, these results may not be generalisable to this wider population.

1.6.2.5 Risk-taking behaviour and PTSD-SUD

Reed *et al.* (2007) found that being male, having fewer years of education, and high early risk taking had statistically significant associations with developing a substance use disorder and PTSD. Risk taking behaviour has also been highlighted as a factor in developing PTSD in individuals with early experiences of trauma (Felitti *et al.*, 1998; Kingston & Raghavan, 2009).

1.6.2.6 Interpersonal functioning and PTSD-SUD

The role of PTSD diagnosis in relapse was investigated by Sharkansky *et al.* (1999) in a sample of substance users enrolled in a relapse prevention programme. The findings indicated that individuals with comorbid PTSD and SUD were significantly more likely to relapse following interpersonal conflict, and after experiencing physical discomfort or unpleasant emotions but not in other high-risk situations such as social pressure to use or experiencing urges to use. Based on these findings, it was proposed that individuals

with PTSD-SUD may require multiple strategies to prevent relapse and trauma-focused interventions may also be of value.

Schiff *et al.* (2002) investigated the associations between intimate partner abuse, drug use, childhood sexual abuse, and psychological distress. The sample comprised female participants from urban methadone maintenance treatment programmes who were given standardised psychometric measures. Women who met criteria for PTSD were more likely to report polydrug use over a six-month period and they were significantly more likely to exhibit injecting drug use than women without PTSD. Furthermore, women who were abused by their partners were found to have significantly higher rates of posttraumatic stress symptoms than non-abused women; however they were not any more likely to meet full criteria for PTSD. These findings therefore suggest that intimate partner violence, a potential consequence of interpersonal conflict, is associated with higher levels of posttraumatic symptomatology.

Self-blame, avoidance coping and negative social reactions to disclosure were found to be related to increased PTSD symptoms and better social support was found to be a protective factor against PTSD (Ullman, Townsend *et al.*, 2006). Again, these findings fit with both the emotional processing and cognitive models of PTSD as they suggest negative appraisals are a key factor in the development and maintenance of PTSD.

1.6.3 Impact on Treatment Outcome

1.6.3.1 Potential for Treatment Drop-Out

Hien *et al.* (2000) investigated the impact of PTSD on short-term treatment outcomes in a sample of ninety-six individuals who attended an opiate-substitute (methadone) prescribing programme. Their results indicated that PTSD did not lead to increased likelihood of treatment drop-out; however it was associated with significantly higher rates of polysubstance use at three-month post-admission and thus significantly poorer treatment adherence than those without PTSD. It was therefore concluded that PTSD was a significant factor in poorer treatment outcomes. An earlier study of pregnant substance abusers enrolled in a residential treatment programme found that diagnosis of PTSD but not trauma exposure was significantly associated with failure to complete treatment (Thompson & Kingree, 1998).

1.6.3.2 Likelihood of Relapse to Substance Misuse

The relationship between trauma history, PTSD symptoms, and addiction relapse has been investigated by Norman *et al.* (2007). The participants were veterans who attended an abstinence-based treatment programme and were divided according to whether they had SUD only, trauma exposure and SUD, or comorbid PTSD-SUD. Around 24% of the total sample met criteria for PTSD and 80% of the trauma-exposed sample met criteria for at least one PTSD symptom cluster. Each participant completed a comprehensive psychiatric evaluation which included measures of substance use disorder, PTSD, and other mental health disorders. These symptoms were then investigated to determine if these were cues to addiction relapse following a period of abstinence. The PTSD-SUD group endorsed significantly more symptoms than the

SUD-trauma and SUD-only groups prior to relapse. Following relapse, the PTSD-SUD reported significantly more anxiety and psychotic symptoms than the other two groups. Participants relapsed most frequently in 'temptation' contexts where they had enhanced emotional states, were testing their personal control, or gave in to temptation, and no differences were detected in the frequency of these situations. Logistic regression analyses indicated that psychiatric symptoms predicted the contexts associated with relapse. In particular, anxiety and PTSD symptoms significantly predicted relapse in negative interpersonal contexts. Relapse was also predicted by PTSD symptoms in situations where participants experienced negative physiological states but appeared to reduce likelihood of relapse in social pressure contexts. No differences were found in post-treatment substance use disorder outcomes between the three groups, which did not support the hypothesis that the PTSD-SUD and SUD-trauma groups would have poorer outcomes than the SUD-only group. This led the authors to propose an alternative hypothesis: that relapse to substance use may impede remission of PTSD rather than PTSD leading to poorer substance disorder treatment outcomes.

Farley *et al.* (2004) investigated the impact of trauma history on relapse and found that probability of relapse increased in line with number of traumatic events experienced. They also discovered that three specific types of traumatic event were associated with relapse: mugging, seeing someone killed or seriously injured, and rape. Potential limitations of this study were the use of trauma history rather than diagnosis of PTSD and history of relapse being determined by retrospective reports of disengagement from previous SUD treatments which does not take into account that individuals may not have

attained abstinence whilst in these treatments, and therefore did not relapse but rather simply failed to achieve abstinence. Despite these limitations, the findings have clinical implications such as the need for early screening for trauma exposure and the need for interventions which are trauma-informed.

Ouimette *et al.* (2007) investigated the relationship between relapse and comorbid SUD and PTSD. This study aimed to build on previous findings that suggested that negative emotions, physical discomfort and interpersonal conflict may be factors in relapse and that PTSD is associated with fewer days of abstinence. Almost half of their sample met criteria for PTSD and no difference in demographic variables or SUD diagnosis was found between those with and those without PTSD. Participants with comorbid PTSD and SUD were found to have significantly more interpersonal cues to drug use, stronger urges to use substances, invested more effort in acquiring substances, were more likely to consider their use was a 'relapse' rather than a lapse, and believed that they were at greater risk of relapsing. These participants were less confident in their ability to handle interpersonal conflicts and resist the urge to use substances. The authors proposed that these findings supported the need for addressing self-efficacy and coping skills when treating PTSD-SUD clients, particularly as interpersonal conflict may precipitate both initial substance use and relapse. Self-efficacy may also be an important issue to address as negative appraisals about the self being incompetent could maintain PTSD symptoms and lead to relapse. However, the small sample size in this study ($N = 65$) does make generalisation of these findings limited.

Mills *et al.* (2007) also investigated the impact of PTSD on treatment outcomes for heroin dependence in both injectors and non-injectors. Based on previous literature suggesting that individuals with PTSD relapse to substance use more quickly, have higher readmission rates, report more ongoing drug use, and evidence poorer psychosocial outcomes, they conducted a longitudinal study of participants with heroin dependence over a two year period. From their summation of the literature into long-term outcomes, they concluded that individuals with comorbid PTSD and SUD had more frequent and severe substance use, and were more likely to be readmitted to treatment than those with SUD alone. The outcomes measured in their study were retention in treatment for heroin dependence, subsequent treatment exposure, heroin and other substance use, general physical and mental health, and employment status. No significant difference in retention or completion rates, time spent in treatment or number of treatment episodes was found between those with and those without current PTSD. Similarly, no difference was observed with regard to heroin or other substance use between groups, and those with PTSD were found to be less likely to be using heroin at two year follow-up which is an unexpected finding. Both groups improved on all domains and improved at the same rate, with the majority of improvement being made in the first three months. However, there were some negative effects of current PTSD as those with current PTSD were significantly less likely to be employed and experienced significantly poorer physical and mental health.

One potential limitation of this study is the classification of 'current PTSD' being based on having received a lifetime diagnosis and experiencing symptoms of the disorder in

the preceding twelve months. This may have meant that symptoms were not sufficient to influence treatment outcome and some participants may not have met full criteria for PTSD. Furthermore, there was no way to determine an association between severity of PTSD symptoms and treatment outcome and some participants in the SUD only group may have had subsyndromal PTSD which would in turn reduce the differences between them and those with current PTSD. The study did not measure severity of substance use on relapse and it is therefore not possible to determine if this is greater amongst those with comorbid PTSD. The authors suggest that the impaired physical, psychosocial and occupational functioning related to PTSD remains problematic for those in SUD treatment which may be due to substance abuse treatment services producing improvements in substance use and associated disability but not addressing the specific symptoms and disability associated with PTSD. They therefore recommend combined treatment approaches for PTSD and SUD as remission from PTSD is associated with better SUD outcomes but remission from SUD has not been found to be associated with improved PTSD outcomes (Cohen & Hien, 2006; Read *et al.*, 2004).

Ouimette *et al.* (1997) conducted a one-year follow-up study investigating the impact of PTSD on substance abuse treatment relative to those with substance abuse only or substance abuse and another comorbid psychiatric diagnosis. The study had a large sample (N = 3699) and female participants were excluded due to their comparatively small numbers. All participants completed measures of substance use, psychological symptoms, interpersonal supports, life stability, coping, and substance-related cognitions. It was found that participants with substance abuse and PTSD improved on

fewer outcome measures than those with substance abuse only or substance abuse and psychiatric diagnosis. Furthermore, there was no difference between the substance abuse and substance abuse-psychiatric group. The PTSD group also exhibited significantly higher rates of negative consequences from substance use, psychological problems, and unemployment and significantly lower rates of social support from partners or friends. Those with PTSD-SUD were shown to be at greater risk of poorer outcomes than SUD-only participants, as they used less positive reappraisal, more cognitive avoidance and emotional discharge coping, more positive substance use expectancies and less positive expectancies for staying abstinent. Individuals with PTSD were also more likely to be readmitted to treatment than those with substance abuse only however, it is possible that this was due to their mental health rather than substance use, given that their rates of readmission were comparable with those with comorbid substance abuse and other psychiatric diagnoses.

A further five-year follow-up study of one hundred male veterans addressed the relationship between treatment and remission at five-year post-admission (Ouimette *et al.*, 2003). PTSD treatment and informal twelve-step self-help interventions in the first year following intensive inpatient SUD treatment were predictive of remittance at five-year follow-up but formal SUD continuing care treatment was not. It was also discovered that earlier (within the first three months of SUD treatment) and longer PTSD treatment was significantly associated with remission at five-years. These findings do not support the view that individuals must attain a period of abstinence prior to addressing PTSD symptoms (NICE, 2005). The positive effect of twelve-step self-

help groups may also aid recovery from both SUD and PTSD as it focuses on providing social support and positive associations with abstinence.

1.6.3.3 Effects of Treatment Modality

There have been concerns raised that integrated treatments for PTSD and SUD, as opposed to sequential treatment for each disorder, may lead to increase in psychiatric symptoms such as anxiety and depression and this was investigated by Killeen *et al.* (2008). Participants in their study were allocated to either a trauma-focused treatment programme or a health education programme on women's reproductive health (which did not address PTSD or trauma) and adverse events questionnaires were completed prior to taking part in the study, on a weekly basis throughout the programme, and at one-week post-intervention. 17% of participants reported study-related adverse effects which involved worsening of PTSD symptoms or increased depression or anxiety as a result of participating in either the trauma-focused treatment or health education programme however, only 3% experienced study-related adverse effects that involved an increase in substance use. Of those study-related adverse effects, 27% were classified as 'mild', 62% as 'moderate' and only 1% as 'severe' (which occurred in the health education programme group). The more sessions a participant attended, the more study-related adverse effects were experienced and it was proposed that this was likely to be an artefact of the research process, given that there was more opportunity to report adverse events. No difference was found between the extent of reporting of adverse effects for the two groups which suggests that the trauma-focused intervention was tolerated by participants.

One limitation of this study is that it did not focus on outcome and it might have been useful to investigate links between attendance, level of adverse events and outcome. Another consideration is that the trauma-focused intervention did not include exposure techniques and therefore these findings do not address concerns about interventions which involve a trauma-processing component. However, as a first intervention, the trauma-focused approach does appear to fit with the staged model of treatment for trauma and SUD and the need to establish safety and coping skills prior to attempting exposure work and processing of the traumatic material.

Cohen and Hien (2006) investigated the impact of complex PTSD and SUD on outcome for a brief CBT intervention. The participants in the study were all women and 88% met criteria for current PTSD, with the remainder having 'subthreshold' PTSD (presence of DSM-IV criteria A, B, and E and either C or D). The study measured PTSD symptomatology, substance use disorders, depression, dissociation, social and sexual functioning. The CBT intervention led to a significant reduction in PTSD and alcohol use disorder symptoms, and a trend towards a decrease in drug use disorder symptoms however this was not significant. There was no effect on other symptoms and it was suggested that future treatments would benefit from focusing on emotional dysregulation and interpersonal problems to address the multiple comorbid conditions and difficult life circumstances which are often present in individuals with complex PTSD and SUD.

Somer (2003) addressed links between childhood trauma, dissociation and abstinence from heroin use. The study compared a group of patients in an Israeli drug misuse service with those in an outpatient stress clinic. It was hypothesised that childhood abuse may lead to chronic autonomic arousal and difficulties in regulating affect. This may then lead individuals to attempt "chemical dissociation" through the use of substances or alternatively they may use substances to overcome psychic numbing and satisfy a need for excitement. There was also a suggestion that oppressed survivors may wish to defy authority and therefore engage in illicit drug use or due to their experiences of abuse, may be more likely to seek out company in social groups where drug use is common and therefore enables them to overcome feelings of isolation and loneliness. It was found that individuals with more severe trauma histories had higher levels of dissociation and heroin users who scored highly on the measure of dissociation were less likely to obtain extended periods of abstinence. This led the author to recommend that post-traumatic symptoms, particularly dissociation, should be addressed prior to the expectation of abstinence.

1.7 Aim of Study

The main aim of the current study was to investigate the impact of comorbid PTSD and SUD on factors affecting treatment compared to SUD alone. Factors investigated included severity of dependence, trauma exposure, physical and psychological health, risk-taking behaviour, and interpersonal functioning. Comorbidity of PTSD and SUD has been shown in some studies to have an influence on treatment outcomes (e.g.

Cocozza *et al.*, 2005; Hien *et al.*, 2005; Mills *et al.*, 2007; Ouimette *et al.*, 2007). It was therefore anticipated that the findings of this study would have implications for the treatment of individuals with PTSD-SUD.

1.8 Hypotheses

Hypothesis 1: Higher levels of dependence on substances will be associated with higher levels of PTSD symptomatology.

Hypothesis 2: Higher number of types of trauma experienced will be associated with higher levels of dependence on substances.

Hypothesis 3: Individuals with PTSD-SUD will have poorer physical and psychological health than individuals with SUD alone.

Hypothesis 4: Individuals with PTSD-SUD are more likely to engage in risk-taking behaviour than those with SUD alone.

Hypothesis 5: Individuals with PTSD-SUD will have higher levels of interpersonal conflict than those with SUD alone.

CHAPTER 2: METHOD

2.1 Design

This study utilised a correlation design for hypotheses one and two, to investigate the relationship between substance dependence and PTSD symptomatology and trauma. A between-subjects design was employed for hypotheses three, four, and five to determine differences in physical and psychological health, risk-taking behaviour, and interpersonal conflict between those with PTSD and SUD and those with PTSD alone.

2.2 Ethical Approval

Ethical approval for the study was gained from the Lothian Local Research Ethics Committee (see Appendix 1) and permission to conduct the study in an NHS site was granted by the NHS Lothian Research & Development department (see Appendix 2).

2.2.1 Ethical Issues

The main ethical issue was that participants who were suffering from PTSD might require debriefing following participation if they became distressed after being asked about their experiences of trauma. This was addressed by offering participants a debriefing session immediately after the measures were completed. Additionally, participants were helped to access community supports. Participants also had support available from their key worker. The researcher was available to discuss the potential impact of PTSD on their drug use with the participant and their key worker if the

participant wished to do so. Participants who met the criteria for moderate PTSD or higher, as measured on the Posttraumatic Stress Diagnostic Scale, were offered a referral to a clinical psychology service or other form of support which was appropriate to their needs.

All potential participants were made aware of the nature of the study, a participant information leaflet was provided (see Appendix 3) and a consent form was completed (see Appendix 4). As some participants may have had difficulties with literacy, both the participant information leaflet and consent form were read aloud and explained to all participants.

As there was a small risk of injury or distress if participants became distressed, the researcher attended the NHS Lothian mandatory Management of Violence and Aggression Course. Personal alarms were available at the community drug problems centre and this was worn by the researcher as a further safety precaution.

The ethics process also requires that potential benefits to participants be considered. This prevalence study was of potential direct benefit to the participants as routine screening for Post-Traumatic Stress Disorder (PTSD) for injecting drug users in the City of Edinburgh area is not currently in place. More generally, it was hoped that participants and other service users would benefit from the findings of this study as it led to the identification of the level of co-occurring PTSD and substance use disorder (SUD). This may lead to routine screening in the population and, where identified,

integrated treatment for PTSD and SUD. As integrated treatment of PTSD and SUD leads to greater treatment gains than treating the conditions sequentially or neglecting to treat one condition (Cocozza *et al.*, 2005; Morrissey *et al.*, 2005), a move towards integrated treatment would be of benefit to service users. Participants were also made aware that their current treatment would not be affected if they declined to participate in the study.

Secondary traumatisation of the researcher was considered as a further ethical consideration. This was addressed by the researcher having regular clinical supervision with a chartered clinical psychologist to discuss any difficulties arising from hearing details of participants' traumatic experiences.

2.3 Participants

Participants were injecting drug users who were identified when they attended the Low Threshold Methadone Programme (LTMP) at a harm reduction service as weekly or daily clients or when they attended the Community Drug Problem Service (CDPS) for methadone maintenance or opiate substitution treatment. Participants were also recruited from abstinence-based programmes which provided support in the form of a key worker. Individuals who used other services at the harm reduction service, such as the Needle Exchange, who were not on a methadone maintenance prescription or equivalent treatment were not considered for inclusion in this study as it was felt that they may not have access to sufficient support and therefore to enquire about trauma in

this population could be detrimental to their mental health. All participants were between 16 and 65 years of age. Potential participants were excluded from the study if: (i) they presented with a psychotic illness, brain damage or other organic impairment; or (ii) if they had a serious medical illness requiring inpatient treatment; or (iii) if they had expressed suicidal or homicidal thoughts.

2.4 Procedure

Participants were drawn from a community sample of injecting drug users who were enrolled on a treatment programme in the NHS Lothian area. The treatment received by these clients was either the prescription of an opiate substitute or an abstinence-based model of treatment. Information about this study including the participant information leaflet was disseminated by the Nurse Manager to the team leaders of the locality teams in the community drug problems service. This was followed up by the researcher meeting with the staff groups at their team meetings to present the rationale for the study and answer any questions. Staff members of the Low Threshold Methadone Programme (LTMP) and the pharmacist responsible for the methadone titration clinic were also contacted by the researcher directly at a team meeting. Potential participants were initially approached via their key worker who gave them a copy of the participant information leaflet, thus all participants in the study had a substance misuse key worker. Recruitment of participants was then followed up by contacting key workers by telephone to arrange suitable times to recruit from their clinics. The participants had at least twenty-four hours in which to decide whether or not to participate in the study after

receiving the information leaflet from their key worker. Participants were then recruited following a brief meeting (no longer than 5 minutes) with the researcher to discuss the rationale for the study, confidentiality and what participation in the study would involve. They were made aware of their right to withdraw from the study at any time and were given the opportunity to ask any questions about the study.

Participants who agreed to take part were given an appointment to complete the measures with the researcher. The measures were administered by the researcher in a clinic room in the main community drug problem service clinic or the participants' local clinic. Prior to completing the measures, the researcher checked that the participant had read and understood the participant information leaflet and gave them the opportunity to answer any questions about the project and outlined the bounds of confidentiality relating to the study. The consent form was then read aloud to the participant and they were asked to initial the boxes to indicate that they had understood the issues relating to their participation and then sign and date the form. The researcher then signed and dated her section of the consent form and a copy was given to the participant to keep. Due to resource implications, interpreters would only have been requested for participants who did not speak English or who used British Sign Language if it was part of their routine clinical care.

The three questionnaires were completed by the participant and the researcher in interview format, with each item read aloud to the participant and responses recorded on the corresponding response sheet. For items which used a Likert-type scale, the options

were explained to the participant and a card was presented with the responses for these items or subscales to aid the participants in choosing their response. The measures used were the Maudsley Addiction Profile (MAP), the Leeds Dependency Questionnaire (LDQ), and the Posttraumatic Stress Diagnostic Scale (PDS). As the MAP contains a section on demographics, this measure was completed first and took around ten to fifteen minutes. The second measure completed was the LDQ which took less than five minutes to complete and the final measure was the PDS which took between ten and fifteen minutes to complete. An hour was scheduled for each participant, with the measures taking approximately thirty to forty minutes to complete and the remaining time allowed for debriefing and arrangements for further support to be arranged if required.

A resource pack was also available for key workers which contained contact information for local agencies which could offer further support. Participants who were found to meet the criteria for Post-Traumatic Stress Disorder were also offered a referral to clinical psychology or another agency which was appropriate to their needs and their key workers were made aware of this information, with the participants' consent.

Following data collection, all identifying information was removed and each participant was allocated a code prior to data analysis.

2.5 Measures

All participants completed three validated measures to yield information relating to the key aims of the study. These measures were chosen as they are standardised and are relatively quick to administer.

2.5.1 The Maudsley Addiction Profile (MAP)

This is a brief, multi-dimensional measure of treatment outcome for individuals with substance use disorders (Marsden *et al.*, 1998; see Appendix 5). The average administration time is around twelve minutes and it is relatively quick to score. It has an introductory section which is adapted to suit local research needs and assesses four domains which have been shown to have associations with both diagnosis of PTSD and with likelihood of success in treatments for drug use. Exploratory principal components analysis identified four factors which accounted for 63% of the variance in scores: the substance use, health risk, health problems and employment (a sub-section of personal and social functioning) domains (Mardsen *et al.*, 1998). These domains were found to be statistically independent, however the crime subsection of the personal and social functioning domain was also found to be linked to the substance use factor. However, this does not necessarily mean that these factors lack discriminant validity.

The introductory section is used to record demographic data: sex, age, time in current treatment, age when first used substances, and number of previous contacts with drug problem services. The remainder of the measure comprises sixty items in four domains which are outlined below.

2.5.1.1 Substance Use domain

The substance use subscale records the frequency, amount and route of administration of alcohol and illicit substances in the thirty days preceding the interview. There are seven named substances – heroin, non-prescribed methadone, illicit benzodiazepines, cocaine powder (cocaine hydrochloride), crack (cocaine base), amphetamine, and cannabis – with space for additional substances to be added (e.g. MDMA/'Ecstasy' or GHB). Participants indicate the route of administration of each substance as being oral, intranasal, inhalation, intravenous or intramuscular. A response card is shown to participants to help them rate the frequency of their use over the past week and route of administration (see Appendix 6). The substance use subscale was found to have excellent concurrent validity for self-reported drug use when compared with the result of a urine drug screening test, where Cohen's kappa (κ) was 0.74 for heroin, 0.65 for methadone, 0.76 for cocaine and 0.79 for benzodiazepines (Marsden *et al.*, 1998).

2.5.1.2 Health Risk domain

The health risk subscale has five items which address injecting behaviour and sexual activity, which are routes of transmission for blood borne viruses such as HIV and Hepatitis C. It contains items which look at frequency of injecting and sharing needles. There is also an item which records number of sexual partners and frequency of condom use in the past thirty days. Marsden *et al.* (1998) found that the three day test-retest reliability for this subscale indicated that the reliability is extremely high for frequency of sharing needles ($\kappa = 0.97$), for number of sexual partners ($\kappa = 0.92$), and for frequency of unprotected sex ($\kappa = 0.88$).

2.5.1.3 Physical and Psychological Health domain

This domain has twenty items and is divided into two subscales. The physical health symptom scale has ten items reflecting five functional systems: general, injection-related, gastro-intestinal, cardiovascular, musculo-skeletal, and neurological. The ten items form five pairs corresponding to each of these five areas. The psychological health symptoms scale also has ten items: five each assessing anxiety and depression. These items are rated on a five-point Likert scale from 'never' to 'always' and a card is presented to enable participants to select their response (see Appendix 6).

Psychometric properties of this subscale have been described by Marsden *et al.* (1998). Internal reliability of the physical health scale was satisfactory ($\alpha = 0.77$) while the internal reliability of the anxiety and depression scales were good ($\alpha = 0.88$ and $\alpha = 0.81$ respectively). Criterion validity of this subscale was assessed by comparing the number of self-reported days where the client experienced medical or mental health (anxiety and depression) symptoms in the previous month with responses to the Addiction Severity Index medical and psychiatric composite scores (ASI; McLellan *et al.*, 1992). The physical health symptom scale and days with medical symptoms indicated excellent concurrent validity ($r = 0.74$, $p < 0.0001$). The psychological health symptom scale also showed very good concurrent validity as the number of days where participants reported anxious thoughts or depressive thoughts correlated highly with anxiety and depression scores ($r = 0.73$, $p < 0.0001$ and $r = 0.69$, $p < 0.0001$ respectively).

2.5.1.4 Personal and Social Functioning domain

This subscale comprises ten items which focus on relationship problems, employment and illegal activity. Frequency of contact with partners, relatives and friends is recorded as is the frequency of conflict with each of these groups in the preceding month. The concurrent validity of the measure of relationship conflict was assessed by comparing the items with the relationship stressors subscale of the Adult Form of the Life Stressors and Social Resources Inventory (LISRES; Moos, 1988). The correlations between the LISRES scales and the partner stressors and conflict scores (r = 0.76, p <0.0001); relatives stressors and conflict scores (r = 0.77, p <0.0001); and friends stressors and conflict scores (r = 0.70, p <0.0001) indicated that concurrent validity was high (Marsden *et al.*, 1998).

Participants are also asked to report how many days they spent in formal employment, absent from work or unemployed in the past month. The final section requires the nature of crimes committed in the past thirty days to be recorded: selling drugs, fraud/robbery, shoplifting, theft from a property, theft from a vehicle, theft of a vehicle, other crimes e.g. selling sex. The test-retest reliability for items relating to employment (κ = 0.99 for days worked; κ = 0.98 for work absences; κ = 0.89 for unemployment) and crime (κ = 0.94 for selling drugs; κ = 0.89 for shoplifting; κ = 0.85 for other crimes including theft from a property, theft from a person, theft from or of a vehicle, and fraud/forgery) was also very high.

2.5.1.5 Other Measures of Treatment Outcome

Other tools which also aim to provide a measure of treatment outcome in a range of areas (such as substance use, medical and psychiatric status, health risk behaviour, interpersonal functioning, employment and criminality) for substance using populations were also considered. These included the Addiction Severity Index – 5th Edition (ASI; McLellan *et al.*, 1992), the Christo Inventory for Substance-misuse Services (CISS; Christo, Spurrell & Alcorn, 2000), and the Opiate Treatment Index (OTI; Darke *et al.*, 1991). These measures were considered less suitable for the purposes of this study than the MAP for the reasons outlined below.

Mäkelä (2004) outlines a number of limitations of the ASI, including that it performs poorly in European settings, that severity ratings should not be used for research purposes as low correlations between severity scores and composite scores for the same problem area indicates unstable concurrent validity, and that several studies have reported low internal consistencies in four of the seven composite scores. This lack of consistency is due in part to the subjective nature of the ratings given by respondents and this is a major weakness of the measure (Darke *et al.*, 1992). Furthermore it has been shown that the ASI is not sufficiently reliable in detecting psychiatric symptoms, particularly with respect to anxiety and depression (Cacciola *et al.*, 1999; Currie *et al.*, 2004). The administration time for the ASI is one hour and a two-day training session should be completed prior to researchers or clinicians using this tool. Given these limitations and time demands, the MAP was deemed a more appropriate tool for the purposes of this study.

The CISS is a briefer interviewer rated screening tool developed for audit purposes. It does not address health status, drug-taking behaviour or interpersonal relationships in any detail and thus provides insufficient information to be of value in this study. Indeed the author of the CISS recommends that it is not used for research purposes (Effective Interventions Unit, 2003). The OTI was also considered and whilst it provided a good overall profile of relevant areas which were looked at in this study and has excellent psychometric properties, the MAP was chosen over this measure. This was due to the OTI taking twice as long to administer (approximately thirty minutes) as the MAP, and because the OTI uses a somewhat less accurate method for calculating substance use (average over previous three episodes of use), records episodes of conflict with no comparison to episodes of contact with conflict to determine quality of relationship, and a dichotomous scale for recording health problems.

2.5.2 Leeds Dependence Questionnaire (LDQ)

This is a ten-item self-completion questionnaire designed to measure severity of dependence on a variety of substances (Raistrick *et al.*, 1994; see Appendix 7). The items are scored on four-point Likert scales from 'never' to 'nearly always' and yield a maximum score of 30. The measure has ten markers of substance dependence which are each accounted for by a single item in the LDQ. These ten markers are pre-occupation, salience of substance use, compulsion to start, planning around substance use, maximise effect, narrowing of use repertoire, compulsion to continue, primacy of effect, constant state, and cognitive set. The markers aim to measure the same phenomena as outlined in the ICD-10 (World Health Organisation, 1992), but also map onto the seven criteria for

substance dependence outlined in the DSM-IV (APA, 1994). The LDQ has been shown to have good internal reliability for a sample of opiate users (α = 0.86; Heather *et al.*, 2001) and good sensitivity, concurrent and convergent validity when used in a sample of drug users with comorbid psychiatric diagnoses (Ford, 1993). In addition to good psychometric properties, norms have been published for users of opioids indicating mild, moderate or severe severity (Heather *et al.*, 2001) which allows individuals to be categorised in this way.

2.5.2.1 Other Measures of Severity

Heather *et al.* (2001) suggested that the Severity of Dependence Scale (SDS; Gossop *et al.*, 1995) may be more useful as a screen for research purposes where a basic measure of dependence is sufficient. However, Gossop *et al.* (1995) reported from their study of the reliability and validity of the SDS that it provides a measure of compulsive drug use rather than a broader measure of dependence. It therefore seemed that the LDQ would provide a more useful measure for this study as it addresses other factors associated with substance dependence such as withdrawal, tolerance and reinstatement.

Another potential measure of dependency is the Substance Dependence Severity Scale (SDSS; Miele *et al.*, 2000a), which is based on the DSM-IV dependence criteria and takes between 30 and 45 minutes to complete, depending on whether an abridged version is used and whether the respondent has polydrug use. It is reported to have good internal consistency and convergent and discriminant validity as indicated by correlations with severity scores which are derived from the ASI composite scales for

alcohol, heroin and cocaine use (Miele *et al.*, 2000b). It offers two measures of dependency – frequency and severity of symptoms, but norms are not available for drug-specific samples. Given the time taken to administer this measure and the lack of norms available, the LDQ was thought to be a more useful measure of dependence.

2.5.3 Posttraumatic Stress Diagnostic Scale (PDS)

This is a 49-item measure which can be used to diagnose post-traumatic stress disorder (PTSD), severity of PTSD and level of functional impairment (Foa, 1995; see Appendix 8). It is based on the DSM-IV diagnostic criteria for PTSD (American Psychiatric Association, 1994; see Appendix 9). The measure comprises three parts which are divided by the DSM-IV criteria. The first part asks the participant to endorse traumatic event(s) that they have either experienced or witnessed. The second part asks the participant to describe which traumatic event was most upsetting for them, the length of time elapsed since the event, whether they or someone else suffered physical harm and whether they thought their own or another person's life was in danger at the time of the event. The third part assesses whether the respondent is re-experiencing the event; has symptoms of avoidance or numbing; or increased levels of arousal. A diagnosis of PTSD can only be made if all six of the DSM-IV criteria are met. The duration of symptoms and degree of impairment in functioning is also recorded. Severity of symptoms, which is rated on a four-point Likert scale, gives rise to four categories ranging from 'mild' to 'severe'. The PDS takes around 20 minutes to complete and is relatively quick to score.

The PDS has been reported to have a high internal consistency, with each of the three symptom clusters measuring a unified construct (Foa *et al.*, 1997). In their 1997 study, Foa *et al.* found that overall symptom severity had the highest reliability (α = 0.92) followed by avoidance, arousal and re-experiencing where α = 0.84, α = 0.84, and α = 0.78 respectively. The measure was also found to have high test-retest reliability with percentage agreement after a 2-3 week interval of 87% (κ = 0.74). Convergent validity of the PTSD diagnoses was determined by comparing them with diagnoses identified by the Structured Clinical Interview for the DSM-III-R (SCID; Spitzer *et al.*, 1990) which indicated 82% agreement between measures (κ = 0.65). Sensitivity of the PDS was 89% and specificity was 75%.

Foa *et al.* (1997) assessed concurrent validity by performing Pearson correlation coefficients between the PDS and the Impact of Events Scale - Revised (IES-R; Weiss & Marmar, 1997), Beck Depression Inventory (BDI; Beck *et al.*,1961), and the State-Trait Anxiety Inventory (STAI; Spielberger *et al.*, 1970). Overall, higher PTSD severity and symptom cluster scores were associated with higher IES-R, BDI and STAI scores. The correlation between the PDS total symptoms severity was similar for both the BDI (r = 0.79) and IES-R (r = 0.78). It was slightly lower for correlations with the STAI State (r = 0.73) and STAI Trait scores (r = 0.74). The PDS re-experiencing score correlated more highly with the IES-R intrusion score (r = 0.77) than the avoidance score (r = 0.72) which was significant $t(227) = 2.10$, $p < 0.05$. The PDS avoidance score was also correlated more highly with the IES-R avoidance score (r = 0.69) than the re-experiencing score (r = 0.51), $t(227) = 4.97$, $p < 0.001$. This suggests that the re-

experiencing and avoidance subscales of the PDS are valid and the high correlation of the arousal subscale with both state and trait anxiety measures on the STAI (r = 0.70) also lends support to the validity of this symptom cluster.

2.5.3.1 Other Measures of Post Traumatic Stress Disorder

The PTSD Symptom Scale (PSS; Foa *et al.*, 1993) was published before the PDS and is available in two versions – an interview version (PSS-I) and a self-report version (PSS-SR). Foa *et al.* (1993) found the PSS-I to be a more sensitive measure of PTSD diagnosis than the PSS-SR, but both were found to be internally consistent and valid measures of PTSD symptom severity. Furthermore, a modified version of the PSS-SR (MPSS-SR; Falsetti *et al.*, 1993) has been shown to be a useful screening tool for PTSD within a substance use disorder (SUD) population (Coffey *et al.*, 1998). Foa & Tolin (2000) have also proposed that the PSS-I is an acceptable alternative to the Clinician-Administered PTSD Scale (CAPS; Blake *et al.*, 1990) which is widely accepted as the "gold standard" measure of PTSD. Although it is deemed to be the gold standard, the CAPS was not considered for use in this study as it takes forty-five minutes to one hour to administer.

It is worth noting that both the PSS-I and the PSS-SR were both developed to have good convergent validity with the DSM-III-R criteria for PTSD (Foa *et al.*, 1993). The PDS, on the other hand, is based on the DSM-IV criteria for PTSD. There are some changes between these sets of criteria which change the construct of PTSD to some extent. The main difference relates to Criterion A which in DSM-III-R requires that an event be

'outside the range of usual human experience and that would be distressing to almost anyone' (American Psychiatric Association, 1987). In the DSM-IV, two features of a traumatic event must be present to meet this criterion. Firstly, that the person witnessed or experienced serious injury to self or others, the threat of death or serious injury to self of others, or death or threat to physical integrity of others. The second feature is that the person's response must have involved 'intense fear, helplessness or horror' (American Psychiatric Association, 1994). One key area which other scales failed to address adequately (if at all) was information about the event which caused the post-traumatic symptoms (i.e. Criterion A) or interference with daily functioning (Criterion F). The PDS was developed in order to address these gaps (Foa *et al.*, 1997).

Wohlfarth *et al.* (2003) reported that a comparison of IES and PDS indicated that either could be used as a screen for PTSD, as the IES had a slightly higher sensitivity and the PDS had a slightly higher specificity but overall the measures were comparable. Creamer *et al.* (2003) investigated the reliability and concurrent validity of the Impact of Events Scale-Revised (IES-R; Weiss & Marmar, 1997) by determining the correlations with the subscales of the PTSD Checklist (PCL; Weathers *et al.*, 1993). Their study indicated that the reliability and validity of the IES-R appears to equal, if not surpass, the PDS but state that the primary disadvantage of the scale is that the items are not derived from the DSM-IV criteria. It also lacks the additional features of an arousal subscale and a measure of functional impairment. For this reason the PDS was selected as the measure of PTSD over the IES-R.

2.6 Power and Sample Size

2.6.1 Hypotheses 1 and 2

Sample size was determined from Cohen (1992) which indicated that a sample size of 30 participants would be required to detect a large effect size (0.35) with an alpha value of 0.05 and power at 0.80.

2.6.2 Hypotheses 3, 4 and 5

A sample size of 52 (26 in each group) was calculated as being required for the three hypotheses which require comparisons of independent sample means (Cohen, 1992). This would detect a large effect size (0.80) with an alpha value of 0.05 and power at 0.80.

2.7 Statistical Analysis

The data were analysed using Pearson's correlational analysis to address hypotheses one and two. Student t-tests were used to analyse the data for the third hypothesis and the fourth and fifth hypotheses were analysed using Mann Whitney U and Chi-square analyses.

CHAPTER 3: RESULTS

3.1 Sample Characteristics

The sample comprised 30 injecting drug users with a mean age of 33.1 years (S.D. = 7.9; range = 19-50), twenty-four (80% of the sample) were male and six (20%) were female. 43.3% (N = 13) of the sample reported being in a relationship and the remainder reported being single. The main source of income was disability or unemployment benefit and 96.7% (N = 29) of the sample were formally unemployed. Reported mean length of drug use was 9.1 years (S.D. = 5.9; range 2-27) and 60% (N = 18) of the sample had previously received treatment for their substance use disorder. The mean length of time in current treatment was 540 days (S.D. = 1095; range = 1-5760). Despite being in substance misuse treatment, 50% (N = 15) of the participants reported that they had injected heroin at least once in the previous month and 23.3% (N = 7) admitted to engaging in criminal activities.

As potential participants were invited to take part in the study by their key workers, who were given copies of the participant information leaflet (see Appendix 3) at their team meeting or via email from the researcher or their team leader, it was difficult to determine how many people were invited to participate in the study in total. Of those who were approached by their key worker and agreed to participate in the study, 43 (58.9%) either later decided not to take part, or were unable to agree a mutually suitable time to meet with the researcher, or failed to attend their meeting with the researcher to

complete the measures. It is unknown how many people were approached by their key worker and declined to take part in the study. It wasn't possible to collect demographic or other data directly regarding those who chose not to take part.

3.2 Descriptive statistics

A descriptive account of the range for each measure or subscale is provided below with the corresponding means and standard deviations. A summary of the means and standard deviations are presented in Table 3.1.

Table 3.1 Summary of Mean Scores on Main Measures [1] (*N* = 30)

	Mean	**Std. Deviation**
LDQ	11.3	7.8
PDS – Symptom severity	26.5	13.1
PDS – Number of traumas	4.8	2.6
MAP – Physical Health	16.8	8.1
5MAP – Psychological Health	20.8	9.5
MAP – Risk Behaviour	1.2	2.7
MAP – Interpersonal Conflict	4.2	8.7

[1] LDQ: Leeds Dependence Questionnaire; PDS: Posttraumatic Stress Diagnostic Scale; MAP: Maudsley Addiction Profile

3.2.1 Leeds Dependence Questionnaire (LDQ)

The LDQ is a measure of global dependence and the overall score is the sum of responses to ten items, tapping ten aspects of substance dependency. The mean for the LDQ was 11.3 (S.D. = 7.84; range = 0-27) which falls within the 'mild' range of opiate dependence. Overall, 73.3% per cent of participants had 'mild' dependence (N = 22), 16.7% had 'moderate' dependence (N = 5), and 10% had 'severe' dependence (N = 3) according to the norms given by Heather *et al.* (2001).

3.2.2 Posttraumatic Stress Diagnostic Scale (PDS)

The PDS is designed to assess each of the DSM-IV criteria for Post Traumatic Stress Disorder. The two measures of interest to this study were Part 2, which looks at exposure to traumatic events (Criterion A) and Part 3 which measures PTSD symptomatology (Criteria B-D: Re-experiencing, Avoidance, and Arousal).

3.2.2.1 Symptom Severity

PTSD symptom severity was determined by the frequency of endorsement of each symptom occurring during the previous month. The mean score on the symptom severity measure was 26.5 (S.D. = 13.1; range = 0-48) which indicates 'moderate-to-severe' PTSD symptom severity. These scores indicated that 10% (N = 3) of the sample had no or 'mild' symptoms of PTSD, 30% (N = 9) had 'moderate' symptoms, 23.3% (N = 7) had 'moderate-to-severe' symptoms, and 36.7% (N = 11) had 'severe' symptoms of PTSD.

The group of participants who met full diagnostic criteria for PTSD ($N = 19$) had a mean symptom severity score of 32.4 (S.D. = 10.7; range = 11-48) which falls within the 'moderate-to-severe' range of severity and those who did not meet full criteria for PTSD ($N = 11$) had a mean symptom severity score of 16.3 (S.D. = 10.6; range = 0-31) which falls within the 'moderate' range.

3.2.2.2 Number of Traumatic Events

The mean number of traumatic events experienced or witnessed by participants was 4.8 (S.D. = 2.6; range = 0-10). The number (and percentage) of each participant reporting each event is shown in Table 3.2 along with the most traumatic event, which is the event that the participants gave as the most distressing event of all those they had experienced.

Table 3.2 Causes of Trauma and Most Traumatic Events

Cause of trauma	**Experienced by participants *N* (%)**	**Considered most traumatic *N* (%)**
Accident or fire	13 (43.3)	0 (0.0)
Natural disaster	0 (0.0)	0 (0.0)
Nonsexual assault (known assailant)	17 (56.7)	6 (20.7)
Nonsexual assault (unknown assailant)	18 (60.0)	2 (6.9)
Sexual assault (known assailant)	10 (33.3)	1 (3.5)
Sexual assault (unknown assailant)	5 (16.7)	0 (0.0)
Combat or war zone	2 (6.7)	1 (3.5)
Sexual abuse	14 (46.7)	2 (6.9)
Imprisonment	17 (56.7)	3 (10.3)
Torture	9 (30.0)	2 (6.9)
Life-threatening illness	9 (30.0)	0 (0.0)
Other	19 (63.3)	12 (41.3)
None	1 (3.3)	N/A

Non-sexual assault by a known assailant was the type of trauma that was most frequently reported as being the most traumatic of all events experienced (20.7% of the sample), followed by traumatic bereavement (13.8%), imprisonment (10.3%), childhood sexual abuse (6.9%), traumatic separation from a parent (6.9%), non-sexual assault by a stranger (6.9%), torture (6.9%), and witnessing a murder (6.9%). The remaining

categories of being held hostage, sexual assault by a known assailant, attempted murder, combat, overdose, and running away from a care home in childhood were each endorsed by a single participant and comprised the remaining 20.7% of the sample.

3.2.3 Maudsley Addiction Profile (MAP)

3.2.3.1 Physical Health

Participants' scores of the physical health subscale of the MAP had a mean of 16.8 (S.D. = 8.1; range = 1-30). No norms were available to indicate levels of severity within this subscale. However, the MAP pilot study conducted by Marsden *et al.* (1998) found that for a sample of community drug users the mean physical health score was 14.9 (S.D. = 6.9) suggesting that the current sample may be representative of injecting drug users in community settings, although the current sample did have slightly poorer physical health than Marsden *et al.*'s pilot sample as indicated by the higher mean score.

3.2.3.2 Psychological Health

The psychological health subscale of the MAP had a mean of 20.8 (S.D. = 9.5; range = 0-36). Again, no norms were available to determine levels of severity and the mean score for the MAP pilot was 16.6 (S.D. = 8.7) which indicated less frequent psychological health problems than the current sample.

3.2.3.3 Risk-taking Behaviour

The mean number of reported incidents of blood borne virus (BBV) risk-taking behaviour within the past 30 days was 2.3 (S.D. = 5.9; range = 0-30). With respect to

these behaviours, eleven participants (36.7%) reported having penetrative sex without a condom in the past month which resulted in sixty-seven episodes of unprotected sex. One participant (3.3%) reported that they had used injecting equipment previously used by another person on two occasions. In total, there were sixty-nine recorded episodes of BBV risk-taking episodes in the current sample. In addition to these BBV risk behaviours, half of the sample reported injecting heroin on at least one occasion resulting in a mean injecting score of 19.1 (S.D. = 37.6; range = 0-180) and there were 583 reported episodes of injecting drug use in the sample. However, as these individuals were not reporting sharing their equipment, they were not included in the BBV risk group.

3.2.3.4 Interpersonal Conflict

The mean number of reported incidents of interpersonal conflict within the past 30 days was 4.2 (S.D. = 8.7; range = 0-34). Of the total sample, twelve participants (40%) reported episodes of interpersonal conflict, seventeen (57%) reported no episodes of interpersonal conflict, and one did not have any interpersonal contact with a partner, relatives or friends in the past 30 days. Thirteen participants reported having contact with a partner during the preceding month and seven (54%) reported that this contact resulted in conflict on at least one occasion. Twenty-three participants reported having contact with relatives, which resulted in conflict for six of the participants (26%) and twenty-one reported having contact with friends, with six reporting conflict (29%).

3.3 Inferential Statistics

3.3.1 Hypothesis 1: *Higher levels of dependence on substances will be associated with higher levels of PTSD symptomatology.*

To test this hypothesis, a correlational analysis was conducted. Pearson's correlation was used as although the dependency data appeared to have a slight positive skew further investigation using Shapiro-Wilk's test indicated that it did not to deviate significantly from the normal distribution (p = 0.24, *n.s.*). Similarly, the PTSD data appeared to have a slight negative skew and the Shapiro Wilk's test indicated that it did not deviate significantly from the normal distribution (p = 0.23, *n.s.*). A positive correlation was found between these two variables, indicating that individuals with higher levels of dependency also had higher levels of PTSD symptomatology (r = 0.59, $p = 0.01, N = 30$). These findings are shown in Table 3.3 below.

3.3.2 Hypothesis 2: *Higher number of types of trauma experienced will be associated with higher levels of dependence on substances.*

A Pearson's correlation was conducted to investigate the relationship between the number of traumas experienced and severity of substance dependence as the distributions did not deviate significantly from the normal distribution. A significant relationship was found between number of traumas experienced and severity of substance use (r = 0.32, p = 0.04, N = 30), where individuals who had experienced a

higher number of types of traumatic events had higher levels of dependence on substances (see Table 3.3).

3.3.3 Hypothesis 3: *Individuals with PTSD-SUD will have poorer physical and psychological health than individuals with SUD alone.*

Individuals who met full diagnostic criteria for PTSD were placed in the 'PTSD-SUD' group ($N = 19$) and those who met partial or no criteria for PTSD were assigned to the 'SUD only' group ($N = 11$). The mean physical health score for the PTSD-SUD group was 18.6 (S.D. = 7.5; range = 7-30) and the mean physical health score for the SUD only group was 14.1 (S.D. = 8.6; range 1-25), indicating poorer physical health in the PTSD-SUD group. As the data were normally distributed, a t-test for independent samples was used. The results approached, but did not reach, significance (t (28) = 1.43, $p = 0.08$, *n.s.*, one-tailed) and so the null hypothesis could not be rejected.

To determine if there was a significant difference between psychological health ratings between the two groups, another independent samples t-test was conducted. The mean for the PTSD-SUD group was 23.1 (S.D. = 8.6; range = 3-36) and the mean for the SUD only group was 16.8 (S.D. = 10.1; range = 0-32), indicating poorer psychological health in the PTSD-SUD group. There was a significant difference in psychological health between those with PTSD and SUD and those who had SUD alone (t (28) = 1. 81, p = 0.04, one-tailed). These results therefore indicated that individuals who had PTSD-SUD

had significantly higher levels of psychological distress than those with SUD alone. Therefore the hypothesis was supported with regards to psychological health, but was only approaching significance in terms of physical health.

Table 3.3 Correlation coefficients between dependence, trauma symptoms, number of traumas, health, risk, and conflict

	Dependency	Trauma symptoms	Number of traumas	Physical health	Psychological distress	Risk-taking behaviour	Interpersonal conflict
Dependency	1.000	0.586**	0.317*	0.165	0.520**	0.093	0.314*
Trauma symptoms	0.586**	1.000	0.366*	0.422*	0.807**	0.037	0.092
Number of traumas	0.317*	0.366*	1.000	0.389*	0.368*	0.186	0.040
Physical health	0.165	0.422*	0.389*	1.000	0.500**	-0.1180	0.126
Psychological distress	0.520**	0.807 **	0.368*	0.500**	1.000	0.006	0.139
Risk-taking behaviour	0.093	0.037	0.186	-0.118	0.006	1.000	0.465*
Interpersonal conflict	0.314*	0.092	0.040	0.126	0.139	0.465**	1.000

** Correlation is significant at the 0.01 level (one-tailed)
* Correlation is significant at the 0.05 level (one-tailed)

3.3.4 Hypothesis 4: Individuals with PTSD-SUD are more likely to engage in risk-taking behaviour than those with SUD alone.

The data for risk-taking behaviour was strongly positively skewed, therefore a Mann-Whitney U test was used to analyse the data. The median number of risk taking behaviours in the preceding 30 days was 0, with an interquartile range of 0 to 2.0. Individuals with comorbid PTSD and SUD were significantly more likely to participate in behaviours which place them at risk of contracting blood borne viruses than individuals with SUD alone as $U = 68.5$, $p = 0.04$ (one-tailed). The hypothesis is therefore supported by these findings.

Due to the high number of participants in both groups reporting no episodes of risk-taking behaviour, further analysis was conducted using a 2 x 2 chi-square to determine if there was a significant relationship between having a diagnosis of PTSD and engaging in risk-taking behaviours (see Table 3.4 below). A significant relationship was found between having a diagnosis of PTSD and engaging in risk-taking behaviour (χ^2 (1) = 2.56, $p = 0.05$) and Cramer's V was 0.29, indicating that approximately 8% of the variance in the frequencies of risk-taking behaviour can be explained by the presence of PTSD.

Table 3.4 Relationship between PTSD and Risk-taking behaviour

	PTSD	No PTSD
Engaged in Risk-taking	9	2
No Risk-taking	10	9

3.3.5 Hypothesis 5: *Individuals with PTSD-SUD will have higher levels of interpersonal conflict than those with SUD alone.*

The data for interpersonal conflict scores were strongly positively skewed (did not meet the requirements for normal distribution) and were analysed using the Mann-Whitney *U* test. The median number of episodes of interpersonal conflict was 0 and the interquartile range was 0 to 3.5. There was no significant difference between the levels of interpersonal conflict experienced by those with comorbid PTSD and SUD and those with SUD alone as $U = 81$, $p = 0.13$ (one-tailed). Thus the hypothesis that individuals with comorbid PTSD-SUD will experience higher levels of interpersonal conflict was not supported.

The relationship between having a diagnosis of PTSD and experience of interpersonal conflict was also explored using 2 x 2 chi-square analysis as a high number of participants reported no experience of interpersonal conflict (see Table 3.5 below). This did not show any significant relationship between diagnosis of PTSD and likelihood of experiencing an episode of interpersonal conflict (χ^2 (1) = 0.34, $p = 0.56$, *n.s.*).

Table 3.5 Relationship between PTSD and Interpersonal conflict

	PTSD	No PTSD
Experienced Conflict	9	4
No Conflict	10	7

3.4 Exploratory Analyses

3.4.1 Severity of Dependence

Further analyses were conducted to determine if severity of dependence on substances was significantly related to other factors such as physical and mental health, risk-taking behaviour, and interpersonal conflict.

3.4.1.1 Dependence and Health

Pearson's r was used to determine if there was a significant correlation between severity of substance dependence and either physical or psychological health. There was no significant association between physical health and severity of substance dependence ($r = 0.17$, $p = 0.19$, *n.s.*, $N = 30$), but there was a positive significant association between severity of substance dependence and psychological distress ($r = 0.52$, $p < 0.01$, $N = 30$).

3.4.1.2 Dependence and Risk

The relationship between severity of dependence and risk-taking behaviour was explored using Spearman's correlation, as the data set for risk-taking behaviour was

highly skewed. No significant relationship between severity of dependence on substances and risk-taking behaviour was found ($r_s = 0.09, p = 0.62, n.s., N = 30$).

Due to number of participants who reported engaging in no blood borne virus risk behaviours, the data were dichotomised into two groups 'risk' (reported one or more episodes of risk-taking behaviour in the previous 30 days; $N = 11$) and 'no risk' group (reported no episodes of risk-taking behaviour in the previous 30 days; $N = 19$). The mean score for the 'risk' group was 12.5 (S.D. = 8.7; range = 1-27) and the mean score for the 'no risk' group was 10.6 (S.D. = 7.4; range = 0-24), indicating higher mean dependence scores in the 'risk' group. A t-test indicated that there was no significant difference in severity of drug dependence between those who reported engaging in behaviours which placed them at risk of acquiring a blood borne virus and those who reported not engaging in these behaviours (t (28) = 0.65, $p = 0.52, n.s.$).

3.4.1.3 Dependence and Conflict

A positive relationship between severity of substance dependence and experience of interpersonal conflict was explored using Spearman's correlation. Higher levels of dependency were associated with higher levels of interpersonal conflict ($r_s = 0.31, p < 0.05, N = 30$). Due to the large number of zero scores for interpersonal conflict, these data were dichotomised into those who reported interpersonal conflict over the preceding 30 days and those who reported no such conflict and a t-test was carried out. The mean substance dependence score for the 'conflict' group was 14.2 (S.D. = 8.6; range = 2-27) and the mean score for the 'no conflict' group was 9.1 (S.D. = 6.7; range =

0-18). There was no significant difference between the 'conflict' (N = 13) and 'no conflict' (N = 17) groups in terms of severity of dependence (t (28) = 1.81, p = 0.08, *n.s.*), although this finding is approaching significance.

3.4.2 Severity of Trauma

Nine of the eleven individuals in the 'SUD only' group met at least one of the DSM-IV criteria for PTSD. It was therefore possible that the PTSD classification did not provide a clear distinction between the groups. Consequently, further correlational analyses were conducted to compare the severity of trauma with the outcome measures. These results are summarised in Table 3.3.

3.4.2.1 Trauma and Health

Pearson's correlations were used to investigate the relationship between severity of trauma symptomatology and physical or psychological health. There was a significant positive relationship between level of trauma severity and ratings of physical health problems (r = 0.42, $p < 0.05$, N = 30), indicating that individuals with higher levels of trauma symptomatology reported more physical health problems. A significant positive association was also found between trauma symptomatology and psychological distress (r = 0.81, $p < 0.01$, N = 30), indicating that individuals with higher levels of trauma symptomatology had greater levels of psychological distress.

3.4.2.2 Trauma and Risk

The correlation between severity of trauma and engaging in risk-taking behaviour was explored using Spearman's rho. There was no significant relationship between levels of trauma symptomatology and reported risk-taking behaviour ($r_s = 0.04, p = 0.85, n.s., N = 30$).

The scores on the 'risk' items were once again dichotomised. The trauma mean score for the group who reported engaging in risk behaviours was 27.9 (S.D. = 12.7; range = 0-44) and the mean score for the group who reported not engaging in risk behaviours was 25.6 (S.D. = 13.6; range = 3-48). A t-test indicated no significant difference between those participants in the group who reported being 'at risk' ($N = 11$) of acquiring a blood borne virus and those who reported 'no risk' ($N = 19$) with respect to levels of trauma symptomatology ($t\ (28) = 0.45, p = 0.66, n.s.$).

3.4.2.3 Trauma and Conflict

Spearman's rho indicated that there was no significant relationship between levels of trauma symptomatology and rates of interpersonal conflict ($r_s = 0.09, p = 0.31, n.s., N = 30$). A t-test comparing participants who reported experiencing recent 'interpersonal conflict' (mean = 27.8; S.D. = 11.3; range = 11-48; $N = 13$) versus those who reported 'no conflict' (mean = 25.5; S.D. = 14.6; range = 0-44; $N = 17$) also found no significant difference between these two groups ($t\ (28) = 0.47, p = 0.65, n.s.$).

3.4.3 PTSD Criteria

To determine whether participants differed in levels of re-experiencing (Criterion B), avoidance (Criterion C), or arousal (Criterion D), they were divided into two groups according to whether they met full diagnostic criteria for PTSD ($N = 19$) or whether they met no or partial diagnostic criteria ($N = 11$). This was to determine whether there were any significant differences between these groups as it was noted that some individuals ($N = 9$) met at least one of the DSM-IV criterion for PTSD but not full diagnostic criteria. It was hypothesised that high levels of trauma symptomatology in one of the three domains could make it difficult to detect differences between the PTSD-SUD and SUD-only groups. The mean scores and standard deviations for each of these criteria are summarised in Table 3.6 below.

Table 3.6 Posttraumatic Stress Diagnostic Scale (PDS) means for participants with and without PTSD

	PTSD ($N = 19$)		**Non-PTSD ($N = 11$)**	
PDS Score	**Mean**	**Std. Deviation**	**Mean**	**Std. Deviation**
Re-experiencing	8.9	4.6	6.6	5.2
Avoidance	12.9	4.8	7.0	4.4
Arousal	10.6	3.8	2.7	2.8

Participants in the 'PTSD' group had significantly higher re-experiencing scores than those in the 'non-PTSD' group (t (28) = 4.03, $p = 0.01$), significantly higher avoidance scores (t (28) = 3.39, $p < 0.05$), and significantly higher arousal scores (t (28) = 2.24, $p < 0.05$).

CHAPTER 4: DISCUSSION

4.1 Summary of findings

The results of this study offer some support for the hypotheses that severity of PTSD is positively related to severity of dependence on substances and individuals with PTSD and SUD are significantly more likely to experience psychological distress and engage in activities which place them at increased risk of blood borne viruses than those with SUD alone. A significant positive relationship was found between number of types of trauma and severity of drug use where individuals who had experienced a greater number of traumas reported higher levels of dependency on substances. No support was found for the hypotheses that individuals with comorbid PTSD and SUD would experience higher rates of interpersonal conflict than those with SUD alone. The results also indicated that those with PTSD-SUD were more likely to have poorer health than those with SUD alone but this finding was only approaching significance.

In addition to these a priori findings, exploratory analyses indicated that there was a significant positive relationship between severity of substance dependence and psychological distress. Statistically significant associations were found between levels of substance dependency and interpersonal conflict and between trauma severity and both physical and psychological health. Comparison of scores on re-experiencing, avoidance, and arousal symptoms between individuals who met full diagnostic criteria for PTSD and those who did not indicated that symptom severity scores were significantly higher for those with diagnosable PTSD. Significant positive correlations

were also found the between severity of dependence on substance scores and re-experiencing, avoidance, and arousal symptom scores.

4.2 Strengths and limitations of the study

A potential strength of the current study is the recruitment from a range of treatment clinics across a NHS health board area. This allowed greater access to individuals receiving treatment for opiate dependence and improved generalisability as participants were not limited to one particular treatment approach or area of residence. The majority of participants were engaged in a substitute-prescribing programme and a small number (N=2) were currently in an abstinence-based treatment model. Individuals who were attending needle exchange services or detoxification were not recruited for ethical reasons and from the available literature; it seems that findings for these groups of individuals may have been different to those in maintenance treatment models (Mark *et al.*, 2006). It was therefore methodologically sounder to use this less heterogeneous sample. Sampling from a UK population was a particular strength as the links between the presence of PTSD and other biopsychosocial correlates which have been shown to influence treatment outcome have not been widely investigated in the literature and only two studies, which both focused on prevalence rates, have been undertaken using UK samples (Christo & Morris, 2004; Reynolds *et al.*, 2005). The current study aimed to increase the generalisability of findings to other UK services by investigating these associations.

Whereas other UK studies have focused on prevalence, the current study investigated links between PTSD and mental health, physical health, blood borne virus risk, and interpersonal conflict in an injecting drug use sample. These factors were assessed using standardised measures which were chosen for their sound psychometric properties and brevity. The measures had subscales which allowed for a range of hypotheses to be investigated through correlational and comparative analyses and inferences to be drawn about the impact of comorbid PTSD and SUD on treatment outcomes.

There are also several limitations to this study which may have implications for the interpretation of the findings. The first is the relatively small sample size of 30 participants. While this sample was determined as being adequate for correlational analyses by the power calculation, the split between those participants meeting diagnosis for PTSD and those not meeting the criteria meant that the comparison of these two groups was likely to be underpowered as the groups did not contain equal numbers. Therefore, a larger sample, or a sample with a more equal distribution between the two groups may have yielded significantly different results. This is especially true of the trend towards significance found for the hypothesis that individuals with PTSD-SUD would have poorer physical health than those with PTSD alone, as a larger sample may have allowed detection of a significant difference between the groups. However, it is worth noting that 97% of all participants reported experiencing an event which they perceived as "traumatic". Although 73% of the 'non-PTSD' sample did not meet DSM-IV Criterion A for a traumatic event (mainly due to individuals not reporting that they or another person was physically injured or there was a perceived threat to life), these

participants continued to experience a number of symptoms which were consistent with a stress-response disorder. It may therefore be argued that the PTSD and non-PTSD groups were, for the most part, not discrete and the results were likely to be affected by the relatively high levels of post-traumatic stress symptomatology which was evident in the 'non-PTSD' group. Brewin *et al.* (1996) has also advised against comparing groups of individuals with 'subthreshold' or 'lifetime' PTSD with those thought to have current PTSD as the former groups may have engaged in premature inhibition of emotional processing.

There is also a possibility that the Posttraumatic Stress Diagnostic Scale (PDS) was not the most appropriate measure of PTSD to use in the current study as no data is available on the use of the PDS with other samples of injecting drug users with which to compare the current sample. However, a comparison of the means and standard deviations for participants who met full diagnostic criteria for PTSD with the pilot data for the PDS (Foa *et al.*, 1997) indicated these were very similar and the means and standard deviations for those who did not meet full criteria for PTSD were slightly higher than those in the Foa *et al.* sample for all areas except the 'Arousal' domain.

Difficulties with recruitment are a recognised difficulty with this population, as injecting drug users can be reluctant to participate in research due to suspicion and lack of trust, belief that the study was not valuable or that they did not have time to participate (Barratt *et al.*, 2006; Spooner *et al.*, 1997). These barriers to participation were observed in the current study as some clients did not believe the research topic was of relevance to

them and therefore were not inclined to take part. This also has implications for the relatively high proportion of clients who were found to meet full diagnostic criteria for PTSD as there may have been a tendency for participants to self-select. It is unclear to what extent this sample is representative of the injecting drug user population as a whole, and therefore to what extent the findings of this study are generalisable. This has been reported as a common difficulty when conducting research with individuals who are injecting drug users as many studies are unable to generate estimated response rates (Dodding & Gaughwin, 1997).

Demographic information available from the Scottish Drug Misuse Database (ISD Scotland, 2008), acquired at the point of individuals entering treatment, reported that the median age of clients presenting for treatment in Scotland was 30 years and that the ratio of males to females was two to one. In Lothian, 21% reported injecting heroin in the month prior to starting treatment and 13% of current injectors reported sharing needles or syringes in the previous month. Sixty-six per cent of those with substance use disorders in Lothian were unemployed and 26% reported that their drug use was funded by crime. Co-occurring physical health issues were present in 65% of new cases of individuals with substance misuse and mental health was reported as a difficulty in 54% of cases. There was no measure of the nature or severity of either physical or mental health problems in the Lothian substance misuse population which makes it difficult to compare to those in the current study. It appears that the sample in the current study is somewhat different from the Lothian substance misuse population as a whole in some respects (i.e. a higher proportion of males and higher rates of unemployment) but may

still be representative of injecting drug users in Lothian in other respects (i.e. age; rates of sharing of injecting equipment; criminal activity). It is also important to note that the Lothian data available represents all individuals with SUD entering treatment in Lothian, and there may be a subgroup of individuals who are injecting drug users who have a slightly different demographic however, this information has not been published.

Another potential limitation was the assessment of blood borne virus risk (BBV), particularly as this was found to be a significant finding in the study. The MAP items pertaining to risk of BBV transmission address sharing of injecting equipment and penetrative sex, but not other potential routes of transmission such as sharing other injecting paraphernalia (such as filters, spoons or tourniquet) or sharing personal hygiene items such as razors. Thus risk behaviours may have been under detected in the current sample. In the Marsden *et al.* (1998) study, 44% ($N = 71$) of injecting drug users reported having unprotected sex and 16.5% ($N = 15$) reported sharing needles and/or syringes. This indicates higher rates of risk-taking behaviour in Marsden *et al.*'s study compared to the current study which may have been due to the participants being newly enrolled in substance dependence treatment.

Risk of BBV transmission via other routes could have been investigated by a more comprehensive measure such as The Blood-borne Virus Transmission Risk Assessment Questionnaire (BBV-TRAQ), which assesses current injecting risk behaviours, sexual risk behaviours, and skin penetration risk factors (Fry & Linterzis, 2003). Fifty-seven per cent of participants in the study did not share injecting equipment but one third did

report having unprotected penetrative sex. Of those participants who reported having unprotected sex, 90% had unprotected sex only with a regular partner and therefore may not have seen any need for condom use. The MAP item relating to injecting behaviour asks specifically about the sharing of needles and syringes, however, it has been shown that Hepatitis C seroconversion can be related to the sharing of other injecting paraphernalia such as filters and spoons (Hagan *et al.*, 2001). Injecting drug users are more likely to share spoons and filters than syringes and there has also been a link proposed between the sharing of injecting paraphernalia and sexual intimacy, where the sharing of injecting paraphernalia is more common amongst regular sexual partners (Gossop *et al.*, 1997). It has been found that consistent condom use with a main sexual partner is inversely correlated with sharing of injecting paraphernalia (Kapadia *et al.*, 2007) and is less common amongst injecting drug users who have a regular sexual partner (Bogart *et al.*, 2005; Houlding & Davidson, 2003). The lower rate of injecting risks may also have been due to participants being in maintenance or abstinence-based treatment and may have been different if recruitment had included those known to needle exchange services or individuals who were not being supported by any agency.

The stage of treatment which participants had reached may have had an impact on their severity of drug use and presence of other symptoms such as physical health problems or BBV risk behaviours. As some of the participants were relatively new to treatment, and therefore were less likely to be 'stable' on their prescribed opiate substitute (i.e. not exhibiting any signs of withdrawal), they may have exhibited higher drug use severity than those who had been in treatment for a longer period of time. Alternatively,

participants could have been more stable than in the injecting drug use population as a whole as they were in treatment and therefore potentially have lower levels of severity of dependence and be less likely to engage in risk-taking behaviours. One way of overcoming this limitation would be to recruit participants at a specific point in treatment to aid more direct comparisons, bearing in mind that findings would be more generalisable to injecting drug users in treatment rather than the IDU population as a whole. It is also a possibility that those individuals who had higher levels of dependence were less likely to volunteer to take part in the current study. However, as there is no published information about levels of dependence in the injecting drug use population available, it is not possible to determine if this is likely.

Participants in the current study had lower overall dependency means compared to opiate users in the LDQ pilot study where Raistrick *et al.* (1994) reported the mean score to be 20.1 (S.D. = 6.8; range = 5-29). This finding of the current study was also lower than that reported in Heather *et al.*'s study of a larger sample where the mean score on the LDQ for opiate users was 21.3 (S.D. = 6.79; range = 0-30). However, it is worth noting that a score of 20 is still considered within the 'mild' range of dependency and comprised 35% of the sample in Heather *et al.*'s study. Although the current sample had much lower scores on this measure, the majority still fell within the same severity bracket as the majority of participants in these other samples. It may therefore have been useful for other measures of drug use severity, in addition to the dependency score, to be considered such as presence of polysubstance use, frequency and amount of consumption of substances, and length of substance using 'career'. While some of this

information was available, it was not in a format that was directly applicable to answering the main hypotheses.

4.3 Interpretation of findings

The following section aims to offer explanations for the findings within the context of the existing literature.

4.3.1 Dependence on Substances and PTSD

The first hypothesis that higher levels of dependence on substances will be associated with higher levels of PTSD symptomatology was supported by the findings of this study. The methodology used to test this hypothesis differed from that employed by other studies – which compared groups of individuals with comorbid PTSD-SUD and SUD only – as it also investigated the correlation between the continuous variables of trauma symptomatology scores and substance dependence scores in addition to comparing groups. However, the positive significant finding is in keeping with some of the other studies which investigated levels of severity and diagnosis of PTSD (Driessen *et al.*, 2008; McFall *et al.*, 1992; Reynolds *et al.*, 2005; Stewart *et al.*, 1999). This finding also appears to overcome one of the limitations of some other studies which chose to compare groups of individuals with PTSD, 'subthreshold' or 'possible' PTSD, and no PTSD symptomatology which showed that when split into such groups, the likelihood of significant differences between each group was reduced (e.g. Bonin *et al.*, 2000; Brown *et al.*, 1999; Pirard *et al.*, 2005). The failure to find differences between groups may

reflect the high rates of exposure to traumatic events in this population and the impact of subthreshold PTSD symptoms on dependence on substances. Therefore investigating the impact of trauma symptomatology on substance dependence using a correlational design may be of greater value as some individuals could potentially have exhibited higher levels of trauma symptomatology in some domains but not others, thus not fulfilling the DSM-IV criteria for PTSD.

4.3.2 Trauma Exposure and Dependence on Substances

The second hypothesis investigated whether participants who experienced more traumatic events would exhibit higher levels of substance dependency. A positive correlation was found between these factors, which is consistent with other studies that highlight associations between cumulative traumatic experiences, particularly when they begin in childhood, and increased risk of developing a substance use disorder. The Adverse Childhood Experiences Study (Edwards *et al.*, 2003; Fellitti *et al.*, 1998) highlighted the link between cumulative trauma in childhood and subsequent dependence on substances, although it did not directly link cumulative trauma with severity of dependence. Bonin et al. (2000) investigated the relationship between polysubstance use and PTSD and found that individuals who engaged in polysubstance use and met criteria for PTSD had more extensive trauma histories than those with PTSD and either alcohol abuse or single illicit drug use. If polysubstance use is taken as a proxy for severity of dependence on substances, then this finding would support the finding that increased number of traumas is associated with higher levels of drug severity.

4.3.3 Impact of PTSD-SUD on Physical and Psychological Health

Participants in the current study were allocated to a 'PTSD-SUD' group if they met full diagnostic criteria for PTSD and a 'SUD only' group if they did not meet full criteria. Comparison of these groups indicated that the difference in physical health problems between those with comorbid PTSD and SUD and those with SUD alone was approaching, but did not reach, significance. This finding does not therefore fully support previous findings that individuals with PTSD-SUD report significantly more physical symptoms, such as cardiovascular and neurological symptoms, bodily pain, and chronic physical health conditions (Ouimette *et al.*, 2006; Tate *et al.*, 2007) but may have done so if a larger sample size had been available. The physical health of individuals with SUD is reported to be poorer than the general population in general due to the negative effects of substance use and associated psychosocial problems (Falck *et al.*, 2007; McKetin *et al.*, 2008; Williamson *et al.*, 2009). In addition to this, PTSD has been highlighted as a mediating factor in physical health problems as it has been shown to be associated with poorer physical health in homeless adults with substance abuse disorders (Nyamathi *et al.*, 2000; Struening & Padgett, 1990) and trauma-exposed college students (Flood *et al.*, 2009). This would suggest that the high rates of physical health problems in individuals with SUD may be so extensive that a ceiling effect is present such that any additional effects of PTSD may not have a significant observable effect.

The current study found that individuals with PTSD-SUD experienced higher levels of psychological health problems than those with SUD only. This is in keeping with the findings of the Nyamathi *et al.* (2000) study which indicated that psychological health problems were associated with a history of abuse, avoidant coping, low self-esteem and poor or dysfunctional social support networks in women with substance use disorders. Comorbid PTSD-SUD has been reported as being associated with a range of other mental health problems such as depression, anxiety disorders, mania, and psychotic-spectrum symptomatology (Becker *et al.*, 2005; Bonin *et al.*, 2000; Wasserman *et al.*, 1997). There is also a proposed link between PTSD-SUD and Cluster B personality disorders (Brown *et al.*, 1999; Casillas & Clark, 2002; Palacios *et al.*, 1999).

4.3.4 Impact of PTSD-SUD on Risk-Taking Behaviour

Participants with comorbid PTSD-SUD were significantly more likely to engage in behaviours which placed them at increased risk of contracting a blood borne virus (BBV) such as sharing needles and syringes and engaging in unprotected penetrative sex. This supports previous studies which showed that risk-taking behaviour was associated with the development of PTSD and substance use disorders (Kingston & Raghavan, 2009; Reed et al., 2007). It has been proposed that PTSD is a mediating factor in the development of BBV risk behaviours in women who are injecting drug users and have a history of childhood sexual abuse (Plotzker *et al.*, 2007; Roxburgh *et al.*, 2006), however, the association is less clear cut for men where substance misuse appears to be a risk factor for BBV but childhood sexual abuse is not (van Dorn et al., 2005). Combat veterans with comorbid PTSD and SUD had significantly higher rates of

HIV infection than those with either PTSD or SUD, indicating that they are likely to have engaged in BBV risk behaviours following the development of PTSD and SUD (Hoff *et al.*, 1997). It may therefore be the case that individuals with comorbid PTSD-SUD are at greater risk of engaging in risk behaviours.

4.3.5 Impact of PTSD-SUD on Interpersonal Conflict

Rates of interpersonal conflict were not found to be associated with a diagnosis of PTSD in injecting drug users in the current study. There are several reasons that may explain why the PTSD-SUD group did not exhibit higher levels of interpersonal conflict than the SUD only group. Firstly, just over half of the sample did not have a partner and many reported having limited contact with family and friends, therefore the potential to experience interpersonal conflict was limited for many of the participants. It is possible that difficulties with interpersonal relationships are so severe for some of these individuals that they are simply no longer involved in any interpersonal relationships. The measure of interpersonal conflict may not have detected such pronounced difficulties as it relies upon the presence of interpersonal relationships. A measure which took into account the presence and quality of interpersonal relationships may have been more appropriate.

Additionally, the wording of the MAP item relating to interpersonal conflict ("had major arguments") may have led participants to report any incident of discordance between themselves and others, irrespective of the severity of the conflict. The MAP pilot study indicated that 20.7% of drug users reported having conflict with their partner, 10.7% had

conflict with relatives, and 5.4% had conflict with friends (Marsden *et al.*, 1998). This indicates that the current sample had similar levels of conflict with partners but higher levels of conflict with relatives and friends. As there was no way of determining the nature of the interpersonal conflict, it is still possible that individuals with PTSD-SUD experienced more severe conflict but not more frequent conflict than those with SUD only. The investigation of the link between interpersonal conflict, PTSD, and SUD could have been explored using a more detailed measure such as the Conflict Tactics Scale-Revised (CTS2; Straus *et al.*, 1996) which has been utilised in studies of domestic violence in couples with PTSD and substance dependence (e.g. Najavitis *et al.*, 2004; Parrott *et al.*, 2003). This would indicate the nature and severity of episodes of interpersonal conflict and also whether the conflict was perpetrated by the participant or their partner. However, it could not address interpersonal conflict with relatives or friends or the issue of individuals who do not have any relationships as a result of severe interpersonal difficulties. It may therefore be necessary to use a combination of measures to clarify any differences in the severity and frequency of interpersonal conflict.

It is possible that the link between interpersonal conflict and PTSD-SUD may be mediated by gender, however the low numbers of female participants in the current study ($N = 6$) prevented this from being investigated. Hedtke *et al.* (2008) reported that women with PTSD-SUD who experienced an episode of interpersonal violence in the period between baseline measures and one- and two-year follow up were more significantly more likely to exhibit PTSD-SUD than those who did not. Similarly,

Ullman, Filipas *et al.* (2006) discovered that women who experienced negative social reactions to their sexual assault and had less social support were more likely to exhibit comorbid PTSD and substance abuse. However, Benda (2006) found that social support (from family, friends or others) had a significant effect on substance use disorder treatment outcome and PTSD severity for women but not for men.

4.3.6 Relationship between Substance Dependence and Psychological Health

Exploratory analyses indicated a significant correlation between severity of substance dependence and psychological problems. The link between substance use disorders and mental health problems has been documented in a number of studies (e.g. Cleary *et al.*, 2009; Darke & Ross, 1997) and this finding is therefore not surprising. It is possible that this finding is due in part to the development of substance dependence as a method of coping with mental health problems. Alternatively, the neurological impact of substances may lead some individuals to develop psychological symptoms. There is also a possibility that psychological symptoms exhibited by individuals with severe substance dependence are due to withdrawal and/or intoxication.

4.3.7 Relationship between Trauma and Health

In addition to the comparison of the PTSD-SUD and SUD only groups discussed above, exploratory analysis highlighted a significant positive correlation between levels of trauma symptomatology and symptoms of both physical and psychological health problems. Such findings have been found in various groups such as older adults (Petkus *et al.*, 2009), women (Dennis *et al.*, 2009; Lang *et al.*, 2008; Wiesbecker & Clark, 2007),

and children (Dorn *et al.*, 2008). This finding therefore supports previous studies which have shown that trauma symptomatology is a risk factor for poorer physical and psychological health. In the instance of physical health problems this may be due to direct physiological effects of injury sustained during the traumatic event or as a consequence of subsequent behaviours such as poor self-care, adverse effects of maladaptive coping practices such as substance abuse or self injury. The increase in psychological health problems may reflect the symptom overlap between trauma and other Axis I disorders, such as hyperarousal, or the development of Axis I disorders following exposure to traumatic events such as major depressive disorder or generalised anxiety.

4.3.8 Comparison of PTSD-SUD and SUD-Only group on PTSD Criteria

The PTSD-SUD group had significantly higher scores than the SUD only group for all three groups of PTSD symptoms (re-experiencing, avoidance, and arousal). This finding indicates that the two groups differed significantly in the severity of PTSD symptoms experienced. Therefore the lack of significant differences between the groups on factors such as physical health and interpersonal conflict may not be due to the presence of trauma symptoms in the SUD only group (which could reduce the likelihood of detecting a significant difference between the groups), but may indicate that these factors are not influenced by the presence of PTSD.

4.3.9 Relationship between Dependence and PTSD Criteria

A significant positive relationship was found between severity of dependence and all three groups of PTSD symptoms. This suggests that individuals with SUD are not more likely to experience arousal symptoms than re-experiencing or avoidance symptoms as has been reported elsewhere (Ford *et al.*, 2007; Rash *et al.*, 2008; Saladin *et al.*, 1995). It has been argued that observed higher rates of 'arousal' (Criterion D) symptoms in individuals with SUD may be due to symptoms of dependence and withdrawal 'mimicking' trauma symptoms. However, the findings of the current study do not support this as severity of dependence was also associated with higher levels of re-experiencing and avoidance symptoms.

4.4 Theoretical implications

This section aims to link the findings of the current study to some of the hypotheses which have been proposed to explain the association between PTSD and SUDs.

4.4.1 Self-medication Hypothesis

The self-medication hypothesis proposes that substance use disorders occur when individuals who have experienced a traumatic event use substances as a method of coping with ('self-medicating') PTSD symptomatology. One method of establishing a relationship between PTSD and SUD is to examine whether the symptoms of one disorder increase as the symptoms of the other increase, thus indicating a gradient of effect (Stewart & Conrod, 2003). This feature of the relationship between PTSD-SUD appears to be supported by the finding of the current study that as levels of trauma

symptomatology increases, so does the severity of dependence on substances. This may be due to increases in arousal symptoms caused by substance use leading to the increased use of substances in an attempt to maintain self-medication. An explanation which has been proposed to account for this relationship is that withdrawal from substances may result in similar symptoms to PTSD arousal symptoms and therefore will lead to individuals with PTSD reporting higher levels of both symptoms (Saladin *et al.*, 1995). This explanation is not supported by the findings of the current study, which showed that severity of dependence was associated with higher levels of re-experiencing and avoidance symptoms, not just arousal symptoms. Furthermore, the items used to determine SUD severity were based on features of dependency other than just those of withdrawal. It is possible that the use of substances to avoid symptoms of PTSD may prevent individuals from being able to 'process' the traumatic event and therefore act to maintain the symptoms, hence self-medication becomes a self-perpetuating cycle.

4.4.2 High Risk Hypothesis

The high risk hypothesis proposes that individuals who have a SUD are more likely to engage in high risk behaviours, which place them at increased risk of experiencing a traumatic event. This in turn may lead to the development of PTSD. The temporal relationship between the onset of PTSD and SUD has been investigated to determine if SUD follows or precedes the development of PTSD symptoms (e.g. Cottler *et al.*, 2001; Johnson *et al.*, 2006). This question was not addressed in the current study as, although time of first heroin use was recorded, it is impossible to determine from this information when dependence became established and whether this preceded the development of

PTSD symptoms. Furthermore, the majority of individuals in the study experienced multiple traumas and only the timing of the most distressing trauma was recorded. Therefore it was not possible to determine temporal links between the onset of PTSD and SUD. The evidence provided in the literature is inconsistent and it is not clear whether there is a temporal causal link between PTSD and SUD (e.g. Cottler *et al.*, 2001; Johnson *et al.*, 2006; Stewart *et al.*, 1998). However, the finding in the current study that all participants except one experienced a traumatic event and all had been diagnosed with substance dependence suggests that there may be other mediating factors which lead to the development of PTSD. This factor may be due to the development of other psychological symptoms and potentially other Axis I disorders. This would fit with the findings of the current study where individuals with PTSD-SUD were found to have significantly higher symptoms of psychological health problems.

4.4.3 Vulnerability Hypothesis

The vulnerability hypothesis or 'susceptibility hypothesis' states that individuals who misuse substances may be more likely to develop PTSD than those who do not have substance misuse problems. This may be due to an underlying factor such as difficulties associated with Axis II disorders (i.e. emotion dysregulation, maladaptive thinking patterns, interpersonal difficulties, impulse control), cognitive impairment, or poor coping strategies. This has been linked to the situation-specific use of substances by some individuals to manage their PTSD symptoms. Situations which have been shown to be associated with greater substance use are those where unpleasant emotions, physical discomfort, and conflict with others have been experienced (Sharkansky *et al.*,

1999). This finding is partially supported by the current study as individuals with greater levels of dependency were found to have higher levels of psychological distress but not more physical symptoms or episodes of interpersonal conflict. Increased levels of substance dependence were also associated with higher levels of trauma symptomatology. Therefore individuals with PTSD-SUD may have an underlying vulnerability which results in features associated with psychological distress (or difficulties with emotion regulation) and interpersonal functioning. It is unclear whether a significant difference in conflict rates between those with PTSD-SUD and those with SUD alone was not found because individuals with PTSD were in less contact with family and friends or whether they did experience higher rates of conflict but with groups of people who were not included in the MAP questionnaire such as 'acquaintances' (e.g. peers on treatment programme or individuals from the local drug scene) and others who were not family or friends (e.g. staff from voluntary or statutory agencies). It is also possible that individuals who experience higher rates of interpersonal conflict and have poorer coping strategies may not seek or engage in treatment for injecting drug use and so were not recruited to this study. Alternatively, these individuals may be enrolled in treatment programmes but these difficulties lead them not to volunteer to participate in the current study.

4.5 Clinical implications

4.5.1 Assessment

The high prevalence rates of PTSD amongst injecting drug users reported in other studies and replicated in the current study suggest that screening for PTSD at the point of entry to substance misuse treatment would be beneficial. Evans & Sullivan (1995) recommend routine enquiry about exposure to traumatic events. It is recommended that this assessment be carried out when individuals are abstinent and have completed the withdrawal process (Read *et al.*, 2003). Brief screening tools such as the PTSD Checklist Civilian Version (PCL-C; Weathers *et al.*, 1994) or the Penn Inventory (Hammarberg, 1992) have been investigated for use with individuals with SUD and revised cut-offs for substance misusing populations are available (Harrington & Newman, 2007). These tools could thus be used by healthcare providers such as GPs or drugs workers and would allow them to refer individuals with suspected PTSD-SUD to psychological or psychiatric services for further assessment and intervention if required.

4.5.2 Intervention

4.5.2.1 Clinical Guidelines

If comorbid PTSD and SUD are mutually maintaining disorders, then integrated treatment should lead to better outcomes for both conditions than treating either disorder alone or sequentially. However, the National Institute of Clinical Excellence Guidelines (NICE, 2005) recommend that individuals with PTSD with drug or alcohol dependence should be treated for their drug or alcohol problem prior to treatment for PTSD. This recommendation is based on a 'Grade C' rating which is given where there is a dearth of empirical evidence and is based on the assumption that to attempt to treat PTSD without first resolving substance misuse will lead to an increased likelihood of destabilisation or

relapse. This has not been borne out in studies which aim to treat comorbid PTSD-SUD with a trauma-informed approach as no adverse effects on substance abuse or psychiatric symptoms have been observed (Cohen & Hien, 2006; Killeen *et al.*, 2008).

In contrast to UK NICE guidelines, US guidelines recommend the use of an integrated treatment for PTSD and Substance Use Disorder (ISTSS, 2009). Their guidelines endorse the use of 'Seeking Safety' (Najavits, 2002), which is the only treatment approach with established effectiveness based on randomized, well-controlled trials. Thus whilst initial methods of treating comorbid PTSD-SUD utilised a sequential approach in which SUD had to be addressed prior to commencing treatment for PTSD, a growing body of research evidence indicates that integrated treatment is more beneficial for this population (Najavits *et al.*, 2009).

4.5.2.1 Integrated treatment

The pilot study evaluating the 'Seeking Safety' integrated programme for PTSD and substance dependence found significant improvements in substance use, trauma-related symptoms, suicide risk, suicidal thoughts, social adjustment, family functioning, problem solving, and depression (Najavits *et al.*,1998). Further studies which have compared 'Seeking Safety' with treatment-as-usual have also shown significant improvements in substance use, PTSD symptoms, and psychiatric symptoms in a range of populations including women, homeless female veterans, adolescents, and dually diagnosed men (Desai *et al.*, 2008; Hien *et al.*, 2004; Najavits *et al.*, 2005; Najavits *et al.*, 2006). The results of these studies suggest that the implementation of trauma-

informed interventions for comorbid PTSD-SUD, either in individual or group format, would be of value to service users such as those who participated in the current study.

4.5.3 Links to Policy Documents

The findings of the current study also have implications for service delivery with reference to national policies and targets. For example, the 18 Week Referral to Treatment (RTT) pathway was set as a benchmark for service delivery in the NHS Improvement Plan (DoH, 2004). It would be anticipated that by providing a comprehensive integrated treatment for comorbid PTSD and substance misuse, both substance misuse and trauma services would be more effectively able to meet this target as a single integrated treatment would be more easily implanted in an eighteen-week time-frame than sequential treatments, which could potentially involve treatment being offered by more than one service.

Similarly, the third Health Improvement, Efficiency, Access and Treatment (HEAT) target set by the Scottish Government in 2007 is of particular relevance to individuals with substance use disorders. The target aims to reduce psychiatric hospital readmissions and as it was noted in that substance misuse is the main diagnosis in 14% of psychiatric hospital readmissions, this is an area which has been highlighted as requiring further development. It is recognized that there are strong associations between substance misuse and trauma and the Scottish Government has recommended that substance misuse services should develop and implement appropriate psychological treatments to meet the mental health needs of their client group. Given that an

association between comorbid PTSD and substance misuse, and overutilization of overnight psychiatric inpatient services has been reported (Brown *et al.*, 1999) a move towards integrated treatment for these clients would be of value and in keeping with aims to meet this target.

Finally, the Scottish Government set out its vision for drug treatment services in the document 'The Road to Recovery' (2008). This document emphasizes a recovery approach which is defined as "a process through which an individual is enabled to move on from their problem drug use, towards a drug-free life" (p.23). As lower levels of abstinence and higher rates of relapse have been observed in samples of clients with comorbid PTSD and substance misuse (Brady, 2001), it seems vital that both conditions be treated if abstinence and recovery are to be achieved. This document also tasks substance misuse services with offering a range of appropriate treatment services and effective integration with generic services. Clearly the development of links between substance misuse and trauma services, or the training of staff in substance misuse services to enable them to work with comorbid service users, would fulfill these requirements.

In keeping with these policies and arising in part from the information gathered in this study, the local substance misuse directorate psychology service has implemented training for psychologists working with clients who present with comorbid PTSD-SUD. It is in the process of setting up an integrated treatment group for PTSD-SUD participants, using the 'Seeking Safety' protocol, which will be co-facilitated by a

psychologist from the substance misuse psychology service and a therapist from the specialist trauma service. It is hoped that the outcome data from this group will enable an evaluation of the effectiveness of an integrated treatment approach for PTSD in injecting drug users in a community setting.

4.6 Future research directions

While it is now widely accepted that high prevalence levels of PTSD exist in samples of individuals with substance use disorders, the implications for treatment of these individuals is less well researched. The current study indicates that comorbid PTSD-SUD is associated with poorer psychological health and increased risk of engaging in activities which may result in blood borne virus infection. Despite the limitations of the study, these findings suggest that individuals entering substance misuse services may benefit from assessment and intervention which addresses these factors by assessing for PTSD-SUD comorbidity and offering integrated treatment if required. Further research into the effectiveness of these developments in service delivery would be a valuable contribution to the existing literature.

Another potential area of research includes the role of Complex PTSD (CPTSD) in the presentation of individuals with substance use disorders (SUDs). Given the number of participants in the current study who experienced multiple traumas or prolonged trauma such as childhood abuse, domestic abuse, or imprisonment, it would be of value to determine if these individuals have a different presentation and/or prognosis than those

with PTSD arising from a single, discrete traumatic event. The current study highlights the complexity of functional relations between PTSD and SUD. These pathways are still not well understood and future research investigating the links between these disorders and associated disorders would be of value. This could include the use of longitudinal studies looking at the development of PTSD and substance use disorders or differences in presentation between those with single and those with multiple or repeated experiences of trauma.

In conclusion, the current study found that PTSD is associated with higher rates of dependence, psychological distress, and risk of acquiring a blood borne virus in a community sample of injecting drug users. These findings highlight that injecting drug users with comorbid trauma symptomatology have additional areas of difficulty as compared to those who do not. It is therefore important to assess for comorbid PTSD and other psychological problems when individuals enter treatment for substance misuse, and to offer integrated treatment models for PTSD-SUD if required. This in turn should lead to more effective outcomes and provide the highest quality of care for injecting drug users with comorbid or multiple psychological disorders.

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APPENDICES

Letter of Ethical Approval

Appendix 1

Lothian NHS Board

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NHS Lothian

Lothian Local Research Ethics Committee 02

Telephone: 0131 536 9061
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25 June 2007

Ms Penny J Leeming
Trainee Clinical Psychologist
University of Edinburgh
The Spittal Street Centre
22-24 Spittal Street
Edinburgh
EH3 9DU

Dear Ms Leeming

Full title of study: **Prevalence of Post-Traumatic Stress Disorder (PTSD) in a Community Sample of Injecting Drug Users.**

REC reference number: **07/S1102/17**

Thank you for your letter of 06 June 2007, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information was considered at the meeting of the Sub-Committee of the REC held on 25 June 2007.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised.

Conditions of approval

The favourable opinion is given provided that you comply with the conditions set out in the attached document. You are advised to study the conditions carefully.

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	*Version*	*Date*
Application	5.3	06 June 2007
Application		21 March 2007
Investigator CV		21 March 2007
Protocol	2	12 April 2006
Letter from Sponsor		01 February 2007
Questionnaire: The Leeds Dependance Questionnaire	Validated	
Questionnaire: Maudsley Addication Profile (MAP)	Validated	
Questionnaire: Posttraumatic Stress Diagnostic Scale	Validated	

Participant Information Sheet: Participant	2	02 May 2007
Participant Information Sheet	1	21 March 2007
Participant Consent Form	1	21 March 2007
Response to Request for Further Information		06 June 2007
Insurance Details		28 July 2007
Supervisor CV		21 March 2007

R&D approval

All researchers and research collaborators who will be participating in the research at NHS sites should apply for R&D approval from the relevant care organisation, if they have not yet done so. R&D approval is required, whether or not the study is exempt from SSA. You should advise researchers and local collaborators accordingly.

Guidance on applying for R&D approval is available from http://www.rdforum.nhs.uk/rdform.htm.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

Feedback on the application process

Now that you have completed the application process you are invited to give your view of the service you received from the National Research Ethics Service. If you wish to make your views known please use the feedback form available on the NRES website at:

https://www.nresform.org.uk/AppForm/Modules/Feedback/EthicalReview.aspx

We value your views and comments and will use them to inform the operational process and further improve our service.

07/S1102/17	**Please quote this number on all correspondence**

With the Committee's best wishes for the success of this project

Yours sincerely

Professor Peter Hayes
Chair

Email: lyndsay.baird@lhb.scot.nhs.uk

Enclosures: *Standard approval conditions*
Site approval form

Copy to: University of Edinburgh

Lothian Local Research Ethics Committee 02

LIST OF SITES WITH A FAVOURABLE ETHICAL OPINION

For all studies requiring site-specific assessment, this form is issued by the main REC to the Chief Investigator and sponsor with the favourable opinion letter and following subsequent notifications from site assessors. For issue 2 onwards, all sites with a favourable opinion are listed, adding the new sites approved.

REC reference number:	07/S1102/17	**Issue number:**	0	**Date of issue:**	25 June 2007
Chief Investigator:	Ms Penny J Leeming				
Full title of study:	Prevalence of Post-Traumatic Stress Disorder (PTSD) in a Community Sample of Injecting Drug Users.				

This study was given a favourable ethical opinion by Lothian Local Research Ethics Committee 02 on 25 June 2007. The favourable opinion is extended to each of the sites listed below. The research may commence at each NHS site when management approval from the relevant NHS care organisation has been confirmed.

Principal Investigator	*Post*	*Research site*	*Site assessor*	*Date of favourable opinion for this site*	*Notes* [1]
Ms Penny J. Leeming	Trainee Clinical Psychologist	NHS Lothian	Lothian Local Research Ethics Committee 02	25/06/2007	

Approved by the Chair on behalf of the REC:

. (Signature of ~~Chair~~/Co-ordinator)

. (Name)

(1) *The notes column may be used by the main REC to record the early closure or withdrawal of a site (where notified by the Chief Investigator or sponsor), the suspension of termination of the favourable opinion for an individual site, or any other relevant development. The date should be recorded.*

University Hospitals Division

Queen's Medical Research Institute
47 Little France Crescent, Edinburgh, EH16 4TJ

NHS Lothian

RESEARCH & DEVELOPMENT OFFICE
Room E1.12

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Dr Tina McLelland

PA to Professor Cubie & Dr McLelland:
Mrs Jill Kelly

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Mrs Susan Shepherd

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Mrs Anne Addison

HAC/SM/approval/2e

5th July 2007

Ms Penny Leeming
Trainee Clinical Psychologist
Spittal Street Centre
22-24 Spittal Street
Edinburgh
EH3 9DU

Dear Ms Leeming

MREC No:	**N/A**
CRF No:	**N/A**
LREC No:	**07/S1102/17**
R&D ID No:	**2007/P/PSY/13**
Title of Research	Prevalence of Post - Traumatic Stress Disorder (PTSD) in a community sample of injecting drug users.
Protocol No/Acronym:	**N/A**

The above project has undergone an assessment of risk to NHS Lothian and review of resource and financial implications. I am satisfied that all the necessary arrangements have been set in place and that all Departments contributing to the project have been informed.

I note that this is a single centre study sponsored by **University of Edinburgh.**

On behalf of the Chief Executive and Medical Director, I am happy to grant management approval from NHS Lothian to allow the project to commence, subject to the approval of the appropriate Research Ethics Committee(s) having also been obtained. You should note that any substantial amendments must be notified to the relevant Research Ethics Committee and to R&D Management with approval being granted from both before the amendments are made.

Please note that under Section A, Q35, NHS Lothian provides indemnity for negligence for NHS and Honorary clinical staff for research associated with their clinical duties. It is not empowered to provide non-negligent indemnity cover for patients. NHS Lothian does not provide indemnity against negligence for healthy volunteer studies. This is the personal responsibility of both NHS and honorary employees and is usually arranged with a medical defence organisation or through the University of Edinburgh.

This letter of approval is your assurance that NHS Lothian is satisfied with your study. As Chief Investigator or local Principal Investigator, you should be fully committed to your responsibilities

within the Research Governance Framework for Health and Community Care, an extract of which is attached to this letter.

Yours sincerely

Professor Heather A Cubie
R&D Director

Enc	Research Governance Certificate	☑ (to be signed and returned)
	NRR authorisation	☐ (to be signed and returned)
	Tissue Policy (if applicable)	☐
	MTA (if applicable)	☐ (to be signed and returned by the recipient of Tissue)

Copies ***Administrators, Research Ethics Committee***

NHS Lothian

Participant Information Sheet

Study title
Prevalence of Post-Traumatic Stress Disorder (PTSD) in a Community Sample of Injecting Drug Users.

You are being invited to take part in a research study. Before you decide it is important to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Thank you for reading this.

What is the purpose of the study?
This study aims to look at the number of injecting drug users in treatment in Lothian who also have Post-traumatic Stress Disorder (PTSD). PTSD is an anxiety disorder that can develop after experiencing a terrifying event or ordeal.

The research will form part of the researcher's work for her Doctorate in Clinical Psychology degree.

Why have I been chosen?
You have been chosen as you are currently being seen by the Harm Reduction Team or the Community Drug Problem Service (CDPS).

Do I have to take part?
It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason. A decision to withdraw at any time, or a decision not to take part, will not affect the standard of care you receive.

What will happen to me if I take part?
If you agree to take part you will be asked to sign a consent form which you will be given to keep with this information sheet. A copy of the consent form will be kept by the researcher.

Participant Information Sheet

Appendix 3

If you decide to take part you will meet up with the researcher in the clinic you attend. The researcher will complete three questionnaires with you which will take about 35 minutes.

Some people may find some of the questions upsetting. If this happens you can decide not to answer these questions and you will be able to talk to someone about how you are feeling. Your medical care will not be affected by your decision not to answer the questions. There will also be an opportunity at end of the meeting to discuss any issues related to the meeting with the researcher. If it is found that you have Post-traumatic Stress Disorder, available forms of support will be discussed with you.

Will my taking part in this study be kept confidential?
All information which is collected about you during the course of the research will be kept strictly confidential. Any information about you which leaves the clinic will have your name and address removed so that you cannot be recognised from it.

What will happen to the results of the research study?
Findings from the study will be presented in a written report to Edinburgh University as coursework for the Doctorate in Clinical Psychology degree.

It may be possible in the future for this report to be published in academic journals or presented at conferences. Participants' names will not be used in any part of the research and the service they attended will not be identified.

If you would like a copy of the results, these can be obtained from the researcher.

Who is organising and funding the research?
This research is part of the coursework for the Doctorate in Clinical Psychology degree at the University of Edinburgh. The researcher is not being paid and expenses are not available for anyone participating in the study.

Who has reviewed the study?
The study has been reviewed by the Lothian Local Research Ethics Committee and the Course Organisation Group of the East of Scotland Clinical Psychology Course:

Contact for further information
For further information please contact the researcher: Penny Leeming, Trainee Clinical Psychologist, Spittal Street Centre on 0131 537 8300.

Thank you for taking time to read this information leaflet.

CONSENT FORM

Title of Study
Prevalence of Post-Traumatic Stress Disorder (PTSD) in a Community Sample of Injecting Drug Users and a Pilot Intervention for Injecting Drug Users with Co-occurring PTSD.

Name of Researcher: Penny Leeming, Trainee Clinical Psychologist

Please initial box

1. I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask questions. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected. ☐
3. I agree to take part in the above study. ☐

Name of Participant	Date	Signature
Name of Person taking consent (if different from researcher)	Date	Signature
Researcher	Date	Signature

1 for patient; 1 for researcher

MAUDSLEY ADDICTION PROFILE (MAP)

SECTION A: MANAGEMENT INFORMATION

Include the study specific information as required (e.g. participant identification, programme codes; interview point)

SECTION B: SUBSTANCE USE

CARD 1

None	1 day only	2 days only	3 days only	1 day a week	2 days a week	3 days a week	4 days a week	5 days a week	6 days a week	Every day	Some other number
0	1	2	3	4	9	13	17	21	26	30	

CARD 2

Oral	Snort/sniff	Smoke/chase	Intravenous	Intramuscular
1	2	3	4	9

a. Enter number of days used in past 30 days [Card 1] – enter "0" for no use;
b. Enter amount used on a typical day in the past 30 days [verbatim]
c. Record route(s) of administration [Card 2]

SUBSTANCE	DAYS USED	AMOUNT USED ON TYPICAL DAY	ROUTE(S)
B1. Alcohol			
B2. Heroin			
B3. Illicit methadone			
B4. Illicit benzodiazepine		Drug:	
B4. Cocaine powder			
B5. Crack cocaine			
B6. Amphetamine			
B7. Cannabis			
B8. Other:			

SECTION C: HEALTH RISK BEHAVIOUR

If no illicit drugs injected in the past 30 days, skip to sexual behaviour questions

C1. Days injected drugs in the past 30 days **[card 1]** Days

C2. Times injected on a typical day in the past 30 days Times

C3. Times injected with a needle/syringe already used by someone else Times

If no penetrative sex in the past 30 days, skip to Section D

C4. Number of people had sex with and not used condom People

C5. Total number of times had sex with and not used condom Times

SECTION D: HEALTH SYMPTOMS

CARD 3

Never	Rarely	Sometimes	Often	Always
0	1	2	3	4

D1. How often experienced the following physical health symptoms

	Never (0)	Rarely (1)	Sometimes (2)	Often (3)	Always (4)
a. Poor appetite	☐	☐	☐	☐	☐
b. Tiredness/fatigue	☐	☐	☐	☐	☐
c. Nausea (feeling sick)	☐	☐	☐	☐	☐
d. Stomach pains	☐	☐	☐	☐	☐
e. Difficulty breathing	☐	☐	☐	☐	☐
f. Chest pains	☐	☐	☐	☐	☐
g. Joint/bone pains	☐	☐	☐	☐	☐
h. Muscle pains	☐	☐	☐	☐	☐
i. Numbness/tingling	☐	☐	☐	☐	☐
j. Tremors/shakes	☐	☐	☐	☐	☐

D2. How often experienced the following emotional or psychological symptoms **[card 3]**

	Never (0)	Rarely (1)	Sometimes (2)	Often (3)	Always (4)
a. Feeling tense	☐	☐	☐	☐	☐
b. Suddenly scared for no reason	☐	☐	☐	☐	☐
c. Feeling fearful	☐	☐	☐	☐	☐
d. Nervousness of shakiness inside	☐	☐	☐	☐	☐
e. Spells of terror or panic	☐	☐	☐	☐	☐
f. Feeling hopeless about the future	☐	☐	☐	☐	☐
g. Feelings of worthlessness	☐	☐	☐	☐	☐
h. Feeling no interest in things	☐	☐	☐	☐	☐
i. Feeling lonely	☐	☐	☐	☐	☐
j. Thoughts of ending your life	☐	☐	☐	☐	☐

SECTION E: PERSONAL/SOCIAL FUNCTIONING

If not in a relationship in the past 30 days, skip to relatives questions

E1. Days had contact with partner in the past 30 days **[card 1]**
(ie. say them or talked on the telephone) _____ Days

E2. Number of these days were there was conflict with partner
(ie. had major arguments) _____ Days

If not relatives or any contact with relatives in past 30 days, skip to friends questions

E3. Days had contact with relatives in the past 30 days **[card 1]**
(ie. say them or talked on the telephone) _____ Days

E4. Number of these days were there was conflict with relatives
(ie. had major arguments) _____ Days

If not friends or any contact with friends in past 30 days, skip to Section E7

E5. Days had contact with friends in the past 30 days **[card 1]**
(ie. say them or talked on the telephone) _____ Days

E6. Number of these days were there was conflict with friends
(ie. had major arguments) _____ Days

E7. Number of days of paid work in past 30 days **[card 1]** Days

E8. Days missed from work because of sickness or unauthorised absence in the past 30 days Days

E9. Days formally unemployed in the past 30 days Days

CARD 4

Selling drugs	Fraud/forgery	Shoplifting	Theft from a property	Theft from a vehicle	Theft of a vehicle	Other crimes

E10. Crimes committed in the past 30 days **[card 4 and card 1]**

	Days committed **[card 1]**	Number of times committed on a typical day **[card 2]**
a. Selling drugs		
b. Fraud/forgery		
c. Shoplifting		
d. Theft from a property		
e. Theft from a vehicle		
f. Theft of a vehicle		
Other crimes: ----------		

END OF INTERVIEW

Card 1

Every day	30
6 days a week	26
5 days a week	21
4 days a week	17
3 days a week	13
2 days a week	9
Seven days	7
Six days	6
Five days	5
Four days	4
Three days	3
Two days	2
One day only	1
Some other number	___
None	0

Card 4

Selling drugs
Fraud/forgery
Theft from a property
Theft from a person
Shoplifting
Theft from a vehicle
Theft of a vehicle
Other theft (specify)

Card B (PDS)

Not at all or only one time	0
Once a week or less/once in a while	1
2 to 4 times a week/half the time	2
5 or more times a week/almost always	3

Card 2

Oral	Snort/sniff	Smoke/chase	Intravenous	Intramuscular
1	2	3	4	9

Card 3

Never	Rarely	Sometimes	Often	Always
0	1	2	3	4

Card A (LDQ)

Never	Sometimes	Often	Nearly always
0	1	2	3

Leeds Dependence Questionnaire

Appendix 7

The Leeds Dependence Questionnaire

On this page there are questions about the importance of alcohol and/or other drugs in your life.

Think about your drinking/other drug use in the last week and answer each question ticking the closest answer to how you see yourself.

	Never	Sometimes	Often	Nearly always
1. Do you find yourself thinking about when you will next be able to have another drink or take more drugs?				
2. Is drinking or taking drugs more important than anything else you might do during the day?				
3. Do you feel that your need for drink or drugs is too strong to control?				
4. Do you plan your days around getting and taking drink or drugs?				
5. Do you drink or take drugs in a particular way in order to increase the effect it gives you?				
6. Do you take drink or other drugs morning, afternoon and evening?				
7. Do you feel you have to carry on drinking or taking drugs once you have started?				
8. Is getting the effect you want more important than the particular drink or drug you use?				
9. Do you want to take more drink or drugs when the effect starts to wear off?				
10. Do you find it difficult to cope with life without drink or drugs?				

Posttraumatic Stress Diagnostic Scale

Appendix 8

This booklet contains 49 items. Use the separate answer sheet to record your responses to the items. For each numbered item, find the corresponding number on your answer sheet and fill in the circle that matches your answer. Use a pencil and fill in the circles on the answer sheet with a heavy, dark mark. Do not make any marks outside the circles. If you want to change an answer, erase it carefully and then fill in your new choice. Do not make any marks in this booklet.

As you mark each answer, be sure that the item number in the test booklet matches the item number on the answer sheet.

PART 1

Many people have lived through or witnessed a very stressful and traumatic event at some point in their lives. Indicate whether or not you have experienced or witnessed each traumatic event listed below by marking Ⓨ for Yes or Ⓝ for No on the answer sheet.

1. Serious accident, fire, or explosion (for example, an industrial, farm, car, plane, or boating accident)
2. Natural disaster (for example, tornado, hurricane, flood, or major earthquake)
3. Non-sexual assault by a family member or someone you know (for example, being mugged, physically attacked, shot, stabbed, or held at gunpoint)
4. Non-sexual assault by a stranger (for example, being mugged, physically attacked, shot, stabbed, or held at gunpoint)
5. Sexual assault by a family member or someone you know (for example, rape or attempted rape)
6. Sexual assault by a stranger (for example, rape or attempted rape)
7. Military combat or a war zone
8. Sexual contact when you were younger than 18 with someone who was 5 or more years older than you (for example, contact with genitals, breasts)
9. Imprisonment (for example, prison inmate, prisoner of war, hostage)
10. Torture
11. Life-threatening illness
12. Other traumatic event
13. If you answered Yes to Item 12, specify the traumatic event on the answer sheet.

IF YOU MARKED YES TO ANY OF THE ITEMS ABOVE, CONTINUE. IF NOT, STOP HERE.

Go on to the next page.

Posttraumatic Stress Diagnostic Scale

Appendix 8.

PART 3

Below is a list of problems that people sometimes have after experiencing a traumatic event. Read each one carefully and choose the answer (0–3) that best describes how often that problem has bothered you IN THE PAST MONTH. Rate each problem with respect to the traumatic event you marked in Item 14.

⓪ Not at all or only one time
① Once a week or less/once in a while
② 2 to 4 times a week/half the time
③ 5 or more times a week/almost always

22. Having upsetting thoughts or images about the traumatic event that came into your head when you didn't want them to
23. Having bad dreams or nightmares about the traumatic event
24. Reliving the traumatic event, acting or feeling as if it was happening again
25. Feeling emotionally upset when you were reminded of the traumatic event (for example, feeling scared, angry, sad, guilty, etc.)
26. Experiencing physical reactions when you were reminded of the traumatic event (for example, breaking out in a sweat, heart beating fast)
27. Trying not to think about, talk about, or have feelings about the traumatic event
28. Trying to avoid activities, people, or places that remind you of the traumatic event
29. Not being able to remember an important part of the traumatic event
30. Having much less interest or participating much less often in important activities
31. Feeling distant or cut off from people around you
32. Feeling emotionally numb (for example, being unable to cry or unable to have loving feelings)
33. Feeling as if your future plans or hopes will not come true (for example, you will not have a career, marriage, children, or a long life)
34. Having trouble falling or staying asleep
35. Feeling irritable or having fits of anger
36. Having trouble concentrating (for example, drifting in and out of conversations, losing track of a story on television, forgetting what you read)
37. Being overly alert (for example, checking to see who is around you, being uncomfortable with your back to a door, etc.)
38. Being jumpy or easily startled (for example, when someone walks up behind you)

---

39. How long have you experienced the problems that you reported above? (Mark only ONE on the answer sheet.)
    1. Less than 1 month
    2. 1 to 3 months
    3. More than 3 months
40. How long after the traumatic event did these problems begin? (Mark only ONE on the answer sheet.)
    1. Less than 6 months
    2. 6 or more months

Go on to the next page.

PART 4

Indicate if the problems you rated in Part 3 have interfered with any of the following areas of your life DURING THE PAST MONTH. Mark Ⓨ for Yes or Ⓝ for No on the answer sheet.

41. Work
42. Household chores and duties
43. Relationships with friends

44. Fun and leisure activities
45. Schoolwork
46. Relationships with your family

47. Sex life
48. General satisfaction with life
49. Overall level of functioning in all areas of your life

DSM-IV Criteria for Posttraumatic Stress Disorder *Appendix 9*

Diagnostic Criteria for Posttraumatic Stress Disorder

A. The person has been exposed to a traumatic event in which both of the following were present:

1) The person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others.
2) The person's response involved intense fear, helplessness, or horror. **Note:** In children, this may be expressed instead by disorganized or agitated behavior.

B. The traumatic event is persistently reexperienced in one (or more) of the following ways:

1) Recurrent and intrusive distressing recollections of the event, including images, thoughts, or perceptions. **Note:** In young children, repetitive play may occur in which themes or aspects of the trauma are expressed.
2) Recurrent distressing dreams of the event. **Note:** In children, there may be frightening dreams without recognizable content.
3) Acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur on awakening or when intoxicated). **Note:** In young children, trauma-specific reenactment may occur.
4) Intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event.
5) Physiological reactivity on exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event.

C. Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by three (or more) of the following:

1) Efforts to avoid thoughts, feelings, or conversations associated with the trauma;

2) Efforts to avoid activities, places, or people that arouse recollections of the trauma;
3) Inability to recall an important aspect of the trauma;
4) Markedly diminished interest or participation in significant activities;
5) Feeling of detachment or estrangement from others;
6) Restricted range of affect (e.g., unable to have loving feelings);
7) Sense of a foreshortened future (e.g., does not expect to have a career, marriage, children, or a normal life span).

D. Persistent symptoms of increased arousal (not present before the trauma), as indicated by two (or more) of the following:

1) Difficulty falling or staying asleep;
2) Irritability or outbursts of anger;
3) Difficulty concentrating;
4) Hypervigilance;
5) Exaggerated startle response.

E. Duration of the disturbance (symptoms in Criteria B, C, and D) is more than 1 month.

F. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

Specify if:

Acute: if duration of symptoms is less than 3 months.
Chronic: if duration of symptoms is 3 months or more.

Specify if:

With Delayed Onset: if onset of symptoms is at least 6 months after the stressor.